The Acquisition of Transitivity Alternations by Bilingual Children

A Comparative Study

Dissertation zur Erlangung des akademischen Grades

Doktor der Philosophie (Dr. phil.)

eingereicht an der Sprach- und literaturwissenschaftlichen Fakultät

der Humboldt-Universität zu Berlin

von

Christina Grey

Disputation: 30 März 2020

Prof. Dr. -Ing. Dr. Sabine Kunst

Präsidentin der Humboldt-Universität zu Berlin

Prof. Dr. Ulrike Vedder

Dekanin der Sprach- und literaturwissenschaftlichen Fakultät

Gutachterinnen:

1. Prof. Dr. Dr. h.c. Artemis Alexiadou

2. Prof. Ianthi Tsimpli

For my mum. . .

Acknowledgements

A number of people are responsible for the completion and submission of this thesis. First and foremost, the warmest thank you to my mum for inspiring me to pursue a PhD and for her unfaltering belief in me throughout life's trials and tribulations. This is for her.

A special thank you to my grandpa. My biggest fan since before I can remember myself. Thank you for believing in me and for always supporting me.

Thank you from the bottom of my heart to Louiza. My best friend, sister, greatest supporter, and honorary linguist. I promise no more talk of puppets after this! Thank you for your constant love and support.

My warmest thank you to Zeta. My mentor, friend, and surrogate mother. You will never know how much you have helped me survive and believe in myself.

A massive thank you to Katia for being so patient with me, for devoting so much time to my project, and for showing me how to conduct proper statistical analyses step-by-step. I have learnt so much from you.

A warm thank you to Evelina. Thank you for lending your voice to "Elenitsa," for tirelessly working to help me develop the tasks, for being by my side to help me collect data in Berlin and for being my friend. No more Playmobil shopping sprees in the (near) future!

Another warm thank you to Eleni (our puppet's namesake) for helping me collect data in Thessaloniki. Thank you for your interest and encouragement. I hope you enjoyed

working with me as much as I did.

A very heartfelt thank you to some very special people who have become my family and were instrumental in this process: Ahmed, Nas, Oksana, and Yash. It takes a village! Each of you knows exactly how valuable your tireless support and encouragement meant to me. I can only hope I am half as good a friend to you as you are to me. Thank you for sticking by my side and for believing in me.

I want to thank my primary supervisor Prof. Artemis Alexiadou for trusting me with this project and for guiding me along the way. I also want to thank her for providing me with generous funding for my research, conferences, and other academic activities. Thank you also to my external supervisor Prof. Ianthi Tsimpli who guided me in this project and helped me with my data collection in Cambridge. Thank you to both for their encouragement and support as well as for their patience. You both helped me to further develop my research ideas and complete this project.

A big thank you to my all of my former colleagues from the RUESHeL group (current and former) for supporting me and encouraging me to keep going. Special mention to Livia, Anastasia, Ben, Odelia, Jens, Gülsen, and Florian. Thank you for your support and company.

Last but most certainly not least, a very special thank you to the participants of my experiments, the primary school of Evosmos in Greece, the primary school Kita Faros in Berlin, the primary school Agios Athanasios in Cambridge. Thank you to all of the individual families who invited me to their homes. Thank you also to the university students who comprised the control group, as well as the directors and teachers of the aforementioned schools whose supportive attitude was crucial in realising this project.

This work was funded by *DFG AL 554/7-1; AL554/7-2: Acquisition of Voice* awarded to Artemis Alexiadou.

Abstract

In Greek, transitivity alternations are expressed using the non-active voice resulting in a morphological underspecification. Essentially, passives and reflexives in Greek, among other structures, can be expressed using the same form; context is often the only means of disambiguation. This study investigates the acquisition of transitivity alternations in Greek comparing two bilingual populations namely, Greek-German and Greek-English bilinguals between the ages of 4 and 8. This study was motivated by the lack of research on the acquisition of transitivity alternations in bilingual populations. It examines whether the dominant language, in this case German and English respectively, interacts with the heritage language, Greek, as they both evolve morphologically. English and German differ from Greek in the way they express reflexivity and passivisation and posed an interesting area of research. 80 bilingual children as well as 40 monolingual children a baseline task: Renfrew's (1998) Expressive Vocabulary Task adapted for Greek by Vogindroukas (2009) and two experimental tasks: a truth-value judgement task (TVJT) and an act-out task (AOT). The findings show that children across populations scored worst in passives thus replicating the results in previous literature.

Zusammenfassung

In Griechisch werden Transitivitätsänderungen durch non-aktives Genus Verbi (Voice) ausgedrückt, was zu einer morphologischen Unterspezifikation führt. Grundsätzlich können passive und reflexive Verben im Griechischen (neben anderen Strukturen) mit derselben Form ausgedrückt werden. Oft ist der Kontext das einzige Mittel zur Disambiguierung. Diese Studie untersucht den Erwerb von Transitivitätsalternationen (transitivity alternations) bei griechischen monolingualen Kindern im Vergleich zu zwei zweisprachigen Populationen, nämlich griechisch-deutschen und griechisch-englischen Kindern im Alter zwischen 4 und 8 Jahren. Es wird untersucht, ob beim Erwerb der jeweiligen morphologischen Systeme die dominante Sprache, in diesem Fall Deutsch bzw. Englisch, mit der Erbsprache (Heritagesprache) Griechisch interagiert. Englisch und Deutsch unterscheiden sich vom Griechischen, indem sie Reflexivität und Passivierung anders ausdrücken, und stellen deswegen ein interessantes Forschungsgebiet dar. In der Studie wurden 80 zweisprachige Kinder sowie 40 einsprachige Kinder untersucht. Sie sollten die folgenden "Spiele" absolvieren: Renfrews (1998) expressive Vokabelaufgabe, angepasst an das Griechische von Vogindroukas (2009), sowie zwei experimentelle Aufgaben: eine Wahrheitsbewertungsaufgabe (truth-value judgement task) und eine Handlungsaufgabe (act-out task). Die Ergebnisse zeigen, dass Passive Verben sind hingegen am schwierigsten zu verstehen und zu produzieren, sowohl für zweisprachige als auch für monolinguale griechische Kinder.

Table of contents

List of figures

List of tables

Nomenclature

Acronyms / Abbreviations

A-Chains Argument Chains

ACDH A-Chain Deficit Hypothesis

ANOVA Analysis of Variance

AoO Age of Onset

AOT Act-out Task

ASD Autism Spectrum Disorder

CAH Canonical Alignment Hypothesis

CI Crosslinguistic influence

GB Government and Binding

GLMM Generalized Linear Mixed Effects Model

L1 First Language

L2 Second Language

LoE Length of Exposure

NAct Non-Active Voice

NP Noun Phrase

PoS Poverty of the Stimulus

SES Socio-Economic Status

TD Typically Developing

TVJT Truth-value Judgement Task

UG Universal Grammar

VP Verb Phrase

Chapter 1

Introduction: Contextualising transitivity alternations

1.1 Introduction: The broader linguistic debate

Studies of how children acquire language in early development facilitate our understanding of the biological roots of language. Linguistic research is best interpreted against the backdrop of the fundamental debate about whether the human brain is hardwired to acquire language and is, as such, genetically determined by nature, or whether language is a manifestation of linguistic experience whereby input holds a central role in the acquisition of linguistic knowledge. A number of studies have provided evidence that children possess *early knowledge* of several linguistic properties. Beyond what children comprehend, a number of studies have also uncovered instances of *late knowledge*. That is, instances of linguistic properties that children do no possess at stage *x* of their development but that they acquire at a later stage *z*.

The question that then arises is how does the child progress from stage *x* to *z*? Are certain mechanisms amenable to maturation? Is everything available from birth? Proponents of either side of the debate have put forward theories that attempt to capture the

developmental stages in which children acquire different linguistic properties, providing justifications that support their respective arguments.

One side of the debate argues for the universality of language. Chomsky (1965, p. 24) argues that languages are governed by a *Universal Grammar* (UG) and children at birth are genetically predisposed to acquire the language they will later become native speakers of by setting the different parameters as they go through the different developmental stages. *The Minimalist Program* proposed by Chomsky (1995) is largely built on these ideas. His claims rest on the "poverty of the stimulus" (PoS) argument put forward by him in 1965 and formalised in 1980 (Chomsky, 1965, 1980). The main idea underpinning PoS is that children, when acquiring their first language, make generalisations that are not found in their input. Therefore, Chomsky proposes that these generalisations can be best explained by innate knowledge.

Conversely, the other side of the debate argues for a *usage-based* account in which children acquire their native language by being exposed to consistent and rich input and by being given ample opportunities to elicit the linguistic properties of that language from that input. Characteristic of this theory is the argument of "frequency" which is captured in one of the main aphorisms of this approach: "structure emerges from use" (Tomasello, 2003). According to this approach, the more frequent a structure is present in the child's input, the more salient it becomes, and, hence, the more likely it is to be acquired earlier than other properties. Crucially, from this perspective, language acquisition does not involve a dedicated language acquisition device. Rather, it involves general cognitive skills such as *intention-reading* and *pattern-finding* (Tomasello, 2003, p. 69).

Both *early* and *late* linguistic knowledge becomes apparent to linguists by conducting carefully designed experiments which are then analysed accordingly. Linguistic research has revealed that seemingly adult-like performance in some domains of the language may be concealing deficits in others and vice versa. That is, what may come across as lack of knowledge can underlie substantial knowledge of some other domains, making it crucial to investigate both the comprehension and production of certain linguistic phenomena.

In this study, we are concerned with linguistic phenomena that pertain to both of these types of linguistic structures. We investigate the acquisition of transitivity alternations and, in particular, the acquisition of passives and reflexives in bilingual children. Both of these types of alternations bear on the maturation of syntax, some of the earliest hypotheses formed to explain them, and the timeline of their acquisition. For instance, studies have shown that reflexive constructions are acquired early across languages in contrast to passives which, with a few exceptions, exhibit a delay with children not performing adult-like until the age of seven in some languages.

The populations under investigation comprise of Greek-English and Greek-German bilingual children and Greek monolingual children between the ages of four and eight. The motivation in choosing to investigate these populations stems from the lack of research on the acquisition of Voice alternations within bilingual populations. Studying monolingual speakers has allowed researchers to extrapolate and theorise about the structures and mechanisms that underlie these alternations within each language and, in turn, to combine the findings to create a unified account for their derivation and acquisition cross-linguistically. Consequently, while monolingual populations of different languages have been extensively investigated and have contributed to the formulation of some of the seminal analyses of the passive and reflexive alternations, bilingual populations have not received the same amount of attention.

Furthermore, this thesis is probing children's knowledge of these two alternations by investigating both the *comprehension* and the *production* of passives and reflexives. By doing so, it hopes to capture the trajectory of their acquisition in the specific bilingual populations it investigates and to uncover seemingly adult-like performance that masks gaps in knowledge as well as deficiencies that mask existing knowledge. Ultimately, it aspires to shed some light on when bilingual children begin to understand and produce these alternations and to inform current theories working towards a universal account of transitivity alternations. Here we have placed a primary focus on comprehension. The reason for this is that a number of studies which have reported difficulties with the

acquisition of passives have done so by investigating solely their production. We believe that investigating their comprehension, in addition to production, might reveal earlier markers of understanding and processing of transitivity alternations which precede their production. By incorporating a forced-production condition in the study, we hope to also capture the beginnings of their production and, possibly, their development until full mastery.

The bilingual children chosen for this study are acquiring two languages which employ different morphological markers for the derivation of these structures and which also mark transitivity alternations differently on the verb. In addition to observing the trajectory of bilingual children in acquiring transitivity alternations, we were also interested in how it compares to that of monolingual children, bearing in mind that bilingual children are acquiring two systems simultaneously. As it has been shown, in languages such as Greek, passives are not fully productive until the age of seven, making the bilingual populations in this study an interesting case-study. Considering that their dominant language is either German or English respectively, it will hopefully be helpful to understand whether the acquisition of these alternations in Greek is aided, delayed, or follows the exact same trajectory as that of monolingual Greek children.

All in all, the main debate that lies at the heart of linguistics is the question of how we acquire language; what is it that triggers this seamless acquisition mechanism and what is necessary for its success. In trying to answer this question, researchers have chosen to focus on the different linguistic domains. This study places itself alongside studies on the acquisition of syntax and morphology, choosing to hone in on bilingual populations.

This thesis is structured as follows. The rest of Chapter 1 delves into the key concepts related to the phenomena under investigation. Section 1.2 illustrates what transitivity alternations are and what they look like in English through a series of examples. The examples are further validated through the grammaticality judgements of English native speakers. Section 1.3 provides an overview of the concept of transitivity

and introduces some key definitions and studies. It starts by presenting traditional definitions of transitivity as proposed by Hopper and Thompson (1982), Jacobsen (1985), and Lazard (1998). It further elucidates relevant terminology namely, agent, patient, and verbal modality as they relate to transitivity. Section 1.4 scrutinises transitivity alternations and identifies some of the key contributions that have been made to the way we analyse them cross-linguistically. The different kinds of transitivity alternations are mentioned and the two alternations this study investigates are further contextualised. Kittilä's (2012) distinction of transitivising and detransitivising alternations is presented alongside some of the fundamental concepts related to the acquisition of passives. Moreover, Borer and Wexler's seminal work from the A-chain deficit hypothesis (Borer and Wexler, 1987) to Wexler's Universal Phase Requirement Hypothesis (Wexler, 2004) is discussed. Section 1.5 presents the case of the Greek non-active Voice. Prominent accounts elaborated on include Alexiadou et al.'s (2015) approach to Voice and the Greek passive and Tsimpli's (2006) discussion of Voice in Greek. Finally, section 1.6 looks at specific examples of transitivity alternations in English, Greek, and German to illustrate the different heuristics involved in their derivation and production. Particular focus is placed on disentangling the different hypotheses that have been put forward for these three languages. Zombolou's (2004) findings on the differences between verbs that are passivisable in Greek and German as well as their morphological realisations are discussed.

Chapter 2 is concerned with the theoretical background and previous research that underpins transitivity alternations. Section 2.1 begins with an overview of some of the seminal work conducted within this domain. Section 2.2 discusses the acquisition of argument structure and the two most prominent accounts that have been put forward. Sections 2.3 and 2.4 discuss the literature on the cross-linguistic acquisition and derivation of passives and reflexives respectively. Section 2.5 presents specific ex-

amples of their acquisition and derivation in English, German, and Greek. Sections 2.6 and 2.7 discuss Voice acquisition in bilinguals and monolinguals respectively.

Chapter 3 introduces the present study, its aims, research questions, predictions, experimental design and the procedures/protocols followed. Section 3.1 stipulates the main aims of the study, section 3.2 states the specific research questions that motivated the study as well as the predictions stemming from them. Section 3.3 specifies the methodology applied and the experimental design. The participants and their characteristics are presented followed by the pilot study as well as the baseline task that was used to create a baseline for the participants that were included in the study. Section 3.4 presents the baseline task and Section 3.5 presents the first task of this study namely, the truth-value judgement task; the materials and procedure followed are delineated. Similarly, section 3.6 presents the second task of this study namely, the act-out task; the materials and procedure followed for these tasks are delineated.

Chapter 4 presents the findings of the current study. Section 4.1 explains the coding procedure followed to prepare the raw data for the statistical analyses that followed as well as the scoring schemes that were implemented. Section 4.2 introduces the models and packages that were used for the statistical analyses and further justifies this choice. Section 4.3 presents the results of the first task; all of the outcome variables and the findings are discussed in detail. In addition to this, the error distribution patterns that emerged from the findings are further analysed. Section 4.4 presents the results of the second task; all of the outcome variables and the findings are discussed in detail. In addition to this, the error distribution patterns that emerged from the findings are further analysed. Section 4.5 summarises the results of the second experiment and section 4.6 looks at the emerging error patterns.

Chapter 5 concludes this thesis. Section 5.1 discusses the main findings against the backdrop of previous research and evaluates their relevance for the theory. Section 5.2 comments on the strengths of the present study and its contributions. Section

5.3 comments on the limitations of the present study. Section 5.4 suggests further avenues worth pursuing for future research.

1.2 Transitivity alternations: An example

Consider the following two English sentences:

(1) a. Lena is getting dressed

b. Lena is getting dressed by her mum

While the interpretation of these two sentences may seem straightforward at first glance, sentence (1b) poses more of a computational challenge once the interpreter arrives at the by-phrase. Up until that point in the sentence, Lena is the only agent; only when the by-phrase is introduced does it become apparent that Lena is not getting dressed herself but instead her mum is dressing her. Most English native speakers have a clear preference for the reflexive interpretation as in sentence (1a). In other words, if the by-phrase were to be omitted in sentence (1b), the default interpretation of the sentence would overlap with the interpretation of sentence (1a). In addition to this, the semantics of the verb *dress* is ordinarily associated with the action of someone getting dressed without any external help so in this case, we would expect Lena to be the agent and the one doing the "dressing."

Correspondingly, sentence (1b) goes against that default interpretation and introduces another agent. From a syntactic point of view, passives, and especially long passives, are generated through a more complex derivation process and this is reflected in longer processing times (Kirby, 2010; Maratsos, 1974). The ambiguity created in sentence (1b) partly stems from a pragmatic standpoint based on the default semantics of the verb *dress*; it is not immediately transparent why it is the case that Lena is getting dressed by her mum. To elucidate this, consider, for instance, the following two sentences:

(2) a. Little Lena is getting dressed

b. Little Lena is getting dressed by her mum

In this case, most English native speakers are able to compute both sentences with the same degree of ease. This is especially interesting because sentence (2b) includes a by-phrase as in sentence (1b). However, world knowledge facilitates the comprehension of sentence (2b): it is conventional for children to receive external help when dressing or at least it becomes less surprising that Lena's mum is dressing her once the additional information that Lena is a child is computed. At this point it should be noted that sentence (2b) is still not the most natural way of expressing the event. A more straightforward way of rephrasing it, and perhaps one that is preferred, would be to use the active voice as in sentence (3):

(3) Lena's mum dressed her

In fact, carrying out grammaticality judgements with native speakers of English divulged a clear preference for the active over the passive voice, which in some cases is deemed unnatural or even understood as ungrammatical. Table 1.1 shows the intuitions of twenty (20) native speakers with regard to the above-mentioned examples; they were asked to categorise them based on whether they thought they sounded natural/grammatical (meaning they thought the sentence was an acceptable English sentence), ungrammatical (meaning they thought the sentence contained an error), or unnatural (meaning they thought the sentence was a correct English sentence but they would not use it).

Sentences	Grammatical	Ungrammatical	Unnatural
Lena is getting dressed	100%		
Lena is getting dressed by her mum	60%	10%	30%
Little Lena is getting dressed	100%		
Little Lena is getting dressed by her mum	90%		10%
Lena's mum dressed her	100%		

Table 1.1 Grammaticality judgements from 20 native speakers of English

There was an overwhelming consensus that sentences (1a), (2a), and (3) were 100% grammatical English sentences, followed by sentence (2b) which had a 90% grammaticality rating with only 10% of the speakers judging it to be unnatural. In contrast to this, sentence

(1b) had a 60% grammaticality rating while 10% of the speakers deemed it ungrammatical and 30% deemed it unnatural. This serves to show that semantics and world knowledge can drive interpretation preferences and, at least in English, passive constructions are more marked. That is to say, they are the least preferred way of expressing the meaning of a sentence such as (3).

All of the above examples illustrate what transitivity alternations are, specifically active-to-passive Voice alternations, what the differences between reflexives and passives are, and what they look like in English. They also provide a snapshot of what this study is about: it investigates the acquisition of transitivity alternations in Greek by Greek-English and Greek-German bilingual children. On the whole, transitivity alternations constitute a well-studied linguistic phenomenon, both within the domain of lexical semantics as well as syntax. In an effort to better understand how and where transitivity alternations are generated, the role they play in discourse as well as the developmental stage in which they are acquired, different hypotheses have been put forward. In the next section, I turn to the basic concept of transitivity which is crucial in contextualising the transitivity alternations this study is concerned with.

1.3 Transitivity: Formal and semantic definitions

> In many languages (and perhaps covertly in all languages) the transitivity relationship lies at the explanatory core of most grammatical processes. (Hopper and Thompson, 1982, p. 1)

Hopper and Thompson very succinctly summarise the role transitivity plays in language; it is a very central one that governs most grammatical processes and contributes to the derivation of meaning. Therefore, before we delve into the specific languages and constructions this study investigates, it is useful to elucidate what we mean when we speak of transitivity. Traditionally, transitivity refers to the classification of verbs into two categories namely,

the transitive and the intransitive ones. This is one of the simplest and most prominent formal definitions for transitivity and, as the terms themselves denote, this classification is based on whether the action described by the verb involves transfer of agency. That is, whether or not the action is transferred from an active participant, known as the *agent*, to a passive participant, known as the *patient*. In other words, transitive verbs involve transfer of action, as they involve two agents whereas intransitive verbs do not, as they only involve one agent. For instance, in sentence (3), provided in section 1.2, Lena's mum is the *agent* performing the act of *dressing* and little Lena is the *patient* experiencing the result of the action denoted by the verb.

Transitivity forms one of the basic tenets of linguistics and encompasses "such facets as agent marking and voice" (Kittilä, 2012, p. 346). Kittilä postulates that "linguistic transitivity is understood ... as the linguistic coding of basic events ... in which a volitionally acting, typically human agent targets its action at a thoroughly affected patient ... and the formal and semantic features associated with the coding of this event type." (p. 346). Transitivity being as central a notion in linguistic coding as it is, it has been defined by a number of researchers from different linguistic perspectives and shaped by different outcomes of linguistic studies; some definitions are more formal and abstract and some others take into account semantics and are more specific. A few representative definitions are included below. One of the prevalent formal definitions, similar to the one above, is Jacobsen's (1985) who notes that:

> Transitivity in natural language is commonly approached in one of two ways. One approach ... defines transitivity in terms of the number of noun arguments necessary to make a predicate coherent. A predicate requiring only one such noun argument is termed intransitive and a predicate requiring two or more transitive ... In a language marking case, no difference in transitive status is accorded to verbs requiring different case patterns, as long as the number of obligatory nouns is the same. (p. 89)

Lazard's (1998) definition of transitivity states that:

> Transitive verbs are those that take a direct object or an object in the accusative: such is the construction of action verbs and assimilates; all the remaining verbs are intransitive. Such a conception is only valid in the case of accusative languages (p. 160)

The former definition singles out arguments as being the main criterion for transitivity "which has the consequence that verbs such as *differ* and *eat* are accorded the same transitivity status despite the differences in the argument structure" (p. 7). The latter definition considers verbs to be transitive only if they take a direct object, an approach which is more reminiscent of the more widely accepted notion of transitivity (p. 348). What follows from these definitions, is a notion of transitivity that is separate from the semantics of agency. However, as Kittilä (2012) notes, if we classify verbs solely on the basis of the notion of *transfer* and *agency* this would fail to capture verbs that do not involve active transfer of action (p. 347). For instance, verbs such as *like* or *love* do not involve any action. They do, however, involve two arguments.

Semantic approaches to transitivity view it on a continuum and do not define it as being binary. It is interesting to note that there are verbs that can fall under either category depending on their syntactic environment. This has led to further classifications especially since verbs sometimes do not behave similarly neither within the same language nor cross-linguistically. Specifically, intransitive verbs pose a challenge. Perlmutter (1978) was one of the first to put forward a framework, the well-known *Unaccusative Hypothesis*, which distinguished between two types of intransitive verbs: *unergative* and *unaccusative* verbs. The former type refers to agentive intransitive verbs such as *run* and the latter refers to stative intransitive verbs such as *fall*. Essentially, this means that the argument of an unergative verb is an underlying subject while the argument of an unaccusative verb is an underlying object. It is cases like this that complicate definitions of transitivity.

According to Kittilä (2012), from the perspective of semantic approaches, transitivity is intertwined with properties such as *agency* and *affectedness* (p. 348). One of the most influential semantically-based definitions of transitivity can be found in Hopper and Thompson's (1980, p. 252) list of transitivity parameters as well as Givón's (1995, p. 76) definition of what the prototypical transitive event is:

- Agent: The prototypical transitive clause involves a volitional, controlling, actively initiating agent who is responsible for the event, thus its salient cause.
- Patient: The prototypical transitive event involves a non-volitional, inactive, non-controlling patient who registers the event's changes-of-state, thus its salient effect.
- Verbal modality: The verb of the prototypical transitive clause codes an event that is compact (non-durative), bounded (non-lingering), sequential (non-perfect), and realis (non-hypothetical). The prototype transitive event is thus fast-paced, completed, real, and perceptually and/or cognitively salient.

Ultimately, semantic definitions such as these, view transitivity on a scalar plane as opposed to a dichotomy of transitive and intransitive verbs separate from agency and affectedness (Kittilä, 2012, p. 349). Bearing the notion of transitivity and all of its different nuances and definitions in mind, in the next section I discuss the notion of transitivity alternations, the different kinds in particular, and I elaborate on the specific ones I am investigating.

1.4 Transitivity alternations under the microscope

Placing transitivity alternations within a larger context will aid us in consequently elucidating, the role they play, the challenge they pose developmentally in terms of acquisition, and the structures through which they are expressed. As mentioned in section 1.3, formally speaking, transitive verbs are those that have at least two overt arguments: an agent and

a patient. There are variations as to the number of arguments licenced by different verbs cross-linguistically. These variations, in turn, affect the valency of the verb in the respective language and result in the use of the different mechanisms that are in place to cope with and express transitivity alternations (Kittilä, 2012, p. 351). Kittilä classifies transitivity alternations in two main types which are adopted in this thesis. They are distinguished between *transitivising* and *detransitivising* alternations.

The former type of alternations refers to cases such as causative or applicative verbs because their valency is increased. In example (4) we have an applicative case which introduces another type of argument: a beneficiary. These type of arguments, and many others, do not fall under the classic labels of agent and patient and they increase the valency of the verb:

(4) Lena is making a salad for her daughter

Conversely, the latter type of alternations refers to cases in which the number of overt arguments required by the verb is decreased, as in (5). Here, the number of overt arguments is reduced since the patient of the action coincides with the agent of the action:

(5) Lena scratched herself

Such are, in fact, the transitivity alternations with which this study is concerned. In other words, both reflexives and passives involve a decrease in the number of overt arguments. Reflexives, on the one hand, are cases in which both the agent and the patient are affected by the event described by the verb. In particular, the agent of a reflexive event targets its action at itself instead of an external patient (Kittilä, 2012, p. 360), as in (5). Passives, on the other hand, involve a decrease in overt arguments by placing the agent in the background (in most languages with the additional option of an agent adjunct, e.g. a by-phrase) while foregrounding the patient who is the only entity affected by the event denoted by the verb. Finally, we should bear in mind that the classification between the two types of transitivity alternations is not always clear-cut and is only adopted for the

purposes of this study as a heuristic that simplifies our discussion of transitivity alternations. Ultimately, the classification depends on the type of event denoted by the verb.

Up until now the discussion of transitivity alternations has been mostly concerned with its theoretical and typological definitions. Moving on to more concrete examples and syntactic and morphological accounts of transitivity alternations, consider how passivisation is expressed in the following examples:

(6) a. The teddy bear was wiped (by the girl) *English*

b. Der Teddybär wurde (vom Mädchen) abgewischt
the teddy bear become.AUX (by the girl) wipe.PAST.PART
German

'The teddy bear was wiped (by the girl)'

c. To arkudaki skupistike (apo to koritsi)
the teddy bear dry.PAST.NACT.3SG (by the girl)
Greek

'The teddy bear was wiped (by the girl)'

All three of these sentences express the same meaning but employ the different morphological marking used to express passivisation in the respective languages. In English (6a), the passive is expressed by way of backgrounding the active agent, in this case the girl, while foregrounding the patient, in this case the teddy bear, and is optionally highlighted through the use of a by-phrase. Morphologically speaking, the construction is built on the basis of the copula, the verb to *be*, with the addition of the past participle. In German (6b), the passive is expressed by way of employing the same backgrounding and foregrounding mechanisms found in English and is also optionally highlighted through the use of a by-phrase. The difference in forming the passive in German is that it does not always rely on the copula but depending on the type of verb and the action denoted, it makes use of different verbs such as *haben* and *wurden*. In Greek (6c), the passive is expressed by way of employing the Greek non-active Voice (Nact) which is morphologically marked on the verb and is characterised by a Voice-diathesis mismatch (see section 1.5 for more details

on the Greek Nact). In the next set of examples, consider how reflexivity is expressed in the same three languages:

(7) a. The teddy bear wiped itself *English*

b. Der Teddybär wischte sich ab
the teddy bear wipe.PAST.REFL PRONOUN PREPOSITION
German

'The teddy bear wiped itself'

c. To arkudaki skupistike
the teddy bear dry.PAST.NACT.3SG
Greek

'The teddy bear was wiped/wiped itself'

What becomes immediately noticeable is that sentence (6c), without the by-phrase, is the same as sentence (7c). In other words, both the passive and the reflexive form of the verb look the same in Greek. This is the type of underspecification that is explored in this study and will be fleshed out in more detail in the next section.

1.5 The case of the Greek non-active Voice

As it was briefly mentioned in section 1.4, Greek Nact is morphologically marked on the verb, it is characterised by a Voice-diathesis mismatch, and it is distinct from active morphology. For illustrative purposes consider again sentences (6c) and (7c). The verb 'skupistike' bears middle morphology and we refer to it as being 'underspecified' for different readings among which are the passive and the reflexive readings. The question that then arises is whether there is a 'default' interpretation for the verb and, if there is, which one of the ones available in Greek.

To address that in this study, we asked 20 native speakers of Greek to provide us with grammaticality judgements between the passive (6c) and the reflexive (7c) interpretation, as shown in Table 1.2. There was a slightly higher preference rating for the passive

interpretation over the reflexive. In fact, the reflexive sentence received a 75% grammaticality rating while 25% deemed it unnatural whereas the passive sentence received a 85% grammaticality rating while 5% deemed it ungrammatical and a further 10% deemed it unnatural:

Sentences	Grammatical	Ungrammatical	Unnatural
To arkudaki skupistike (7c)	75%	0%	25%
To arkudaki skupistike apo to koritsi (6c)	85%	5%	10%

Table 1.2 Grammaticality judgements from 20 native speakers of Greek

Tsimpli (2006) and Fotiadou and Tsimpli (2010) have argued that subject animacy drives interpretation which may explain the slightly higher preference for the passive sentence in Table 1.2. For this reason, we wanted to see if the above preferences would change due to a shift in subject animacy. When we asked the same 20 Greek speakers to provide us with grammaticality judgements for the sentences in Table 1.3, we found that when we change the subject from 'teddy bear' to 'the boy' the reflexive sentence received a 100% grammaticality rating while the passive sentence maintained its high rating and received a 90% grammaticality rating while 5% deemed it ungrammatical and a further 5% deemed it unnatural.

Sentences	Grammatical	Ungrammatical	Unnatural
To agori skupistike (equivalent to 7c)	100%	0%	0%
To agori skupistike apo to koritsi (equivalent to 6c)	90%	5%	5%

Table 1.3 Grammaticality judgements from 20 native speakers of Greek

Interestingly, when we asked a different group of 20 native speakers of Greek to provide us with an interpretation for sentence (7c) which contains a morphologically underspecified verb in Nact, two interpretations were most frequent as shown in Table 1.4:

Sentences	Reflexive interpretation	Passive interpretation
Greek sentence	80%	20%

Table 1.4 Interpretation preference from 20 native speakers of Greek

That is, there was an overwhelming preference for the reflexive interpretation when no other context was provided. Passives in Greek are generally underused and thus marked which could explain what is driving the preference for the reflexive interpretation. This was taken into account when designing the experimental tasks and specifically when designing the trials that tested the passive in Greek (3.5).

Moreover, as Alexiadou et al. (2015) explain, "it has been pointed out especially in the typological and the more traditional literature that it is not correct to assimilate the Greek passive to passives of the English or German type, as they show a number of significant differences that cannot be accommodated in a uniform approach." (Alexiadou et al., 2015, p. 120). Moreover, passives in Greek involve an implicit external argument and they share a syntactic property responsible for the morphological syncretism (Alexiadou et al., 2015, p. 101). In particular, they "contain the verbal projection responsible for the introduction of external arguments, which lacks, however, a specifier and is therefore realized with non-active morphology" (p. 101). They further point out that it is the "presence of a thematic agent feature on the relevant verbal head only in the case of passives (and reflexives)" that distinguishes these underspecified forms from others in Greek.

Embick (1998) was one of the first to propose that the underspecification of the Greek Nact points in the direction of a syntactically projected external argument. Furthermore, Alexiadou et al. (2015), adopt the main idea behind Embick's argument and assume that there is a distinction between the semantics and the morphological realisation of Voice. According to them, "the non-projection of the external argument as a specifier is a necessary and sufficient condition to yield a non-active form, independently of whether Voice has semantic impact or not" (Alexiadou et al., 2015, p. 101). In concrete terms, they "propose

that a Voice head is spelled out with non-active morphology in Greek, if it lacks a specifier". This essentially means that passives of this kind do not have a syntactically projected external argument in Spec, VoiceP and that passives in languages such as Greek should be interpreted as interlinked to the semantic properties or features of Voice which introduces an existentially bound (i.e. implicit) argument and a thematic feature for it. Crucially, they support that expletive Voice in Greek lacks a specifier and is spelled out as non-active due to the Spell Out rule in (8). In Germanic and Romance, expletive Voice projects a specifier and a SE-reflexive is merged there (p. 108).

(8) Voice -> Voice[NonAct]/ ___No DP specifier

And this is the morphological Spell Out for semantically reflexive verbs:

(9) [VoiceP DP Voice [vP v REFL]] *Semantically Reflexive Verb*

1.6 Passives and reflexives in English, Greek, and German: Similarities and differences

When it comes to accounting for the differences in how the passive and the reflexive are expressed in English, Greek, and German, especially in the typological and the more traditional literature, it has been pointed out that Greek passives should not be treated like the passives of the English or German type. Crucially, not all Greek verbs are passivisable unlike verbs in English and German (although some restrictions do apply as to which verbs can form passives in English) (Zombolou et al., 2010, p. 120).

As Zombolou (2004) points out, the following verbs cannot easily form a passive in Greek (for some speakers the passive is not an option at all), while they can in English and German: *haidevo* "stroke," *derno* "beat," *klotsao* "kick," *frondizo* "take care of." (Zombolou, 2004, p. 121). In addition to this, the use of the by-phrase is restricted in Greek as it is characterised by "reduced agentivity." Zombolou et al. (2010) have proposed

that the lack of a comparable syncretism in languages like English and German that is to say, the fact that passive morphology in English and German can only be interpreted as passive and is not underspecified for other readings like in Greek, reflects a crucial difference between passives in the two types of languages, and is not an accidental morphological problem. More importantly, they claim that this morphological uniqueness reflects the fact that they are also structurally unique and propose that English and German passives are built on the basis of a structure that already contains the verb's external argument.

On the other hand, in Kratzer's (1996) and Embick's (1997) models, actives and passives are not in a dependency relation. Based on the account this thesis adopts, the passive formation in English and German is based on the availability of a transitive input. This means that passives rely on the existence of another layer that contains an external argument. In other words, in English and German, passive is a functional head which selects VoiceP (p. 123). What is more, in the passive, the external argument of the verb is not always overtly expressed. However, it is generally agreed upon that it is implicitly present, as it is semantically and syntactically active. This is suggested by a number of well-known tests, such as the licensing of (i) purpose clauses, (ii) agentive by-phrases, (iii) agentive adverbs, or (iv) instrumental phrases.

Syntactic structures may differ cross-linguistically even in languages with shared typological grammatical features. In that respect, English and German are both similar in how they express passives. Both languages rely on the verb to be and the past participle. Similarly, reflexives in both languages are formed using the active voice accompanied by a reflexive pronoun. However, reflexives exhibit a difference in their saliency in German because they are always accompanied by the reflexive pronoun *sich* that clearly marks reflexivity. In English, on the other hand, the pronoun *-self* may follow a reflexive construction but is not always necessary (see Section 2.3.1).

Specifically, the reflexive alternation involves naturally reflexive verbs including 'body care verbs' such as *wash* and *comb*, less frequent reflexive verbs such as *scratch (one's self)*, and verbs of "assuming position" such as *sit down* and *turn*. In English, these verbs

can surface either with a DP object (10a) or without (10b). The latter sentence receives a reflexive interpretation for most native speakers of English (*Lena washed* is ambiguous between the reading *he washed himself* and *he washed something else*, although it should be noted that for some speakers only the former sentence is felicitous with a reflexive reading).

(10) a. Lena washed herself/Mary

b. Lena washed

Reflexives make reference to two theta roles (agent and patient) which in the case of (10a) are both assigned to the same entity, the single DP argument. Naturally disjoint verbs, such as *hate*, e.g. John hates himself, necessarily require an overt reflexive to achieve a reflexive interpretation (Kemmer, 1993; König and Vezzosi, 2004; Reinhart and Reuland, 1993). In a language like English, natural reflexives involve active verb morphology. However, in languages such as German and Greek, the morphological realisation of reflexives is more complex: German has a light reflexive pronoun *sich* (a SE-Anaphor in the terminology of Reinhart and Reuland (1993)) which is used to mark naturally reflexive verbs (11a), among others (Schäfer, 2008). Passives, are built on the basis of an auxiliary, werden, and a past participle (11b).

(11) a. Das Mädchen wäscht sich *Naturally Reflexive*
the girl wash-3SG REFL
'The girl washes herself'

b. Das Mädchen wird gewaschen *Passive*
the girl become-AUX wash-PASS.PART
'The girl is washed'

Sich is also used with naturally disjoint verbs to yield a reflexive interpretation (12). Therefore, German, unlike English, does not make a morphological distinction between naturally reflexive and naturally disjoint verbs. The addition of the intensifier *selbst* 'self', while often possible, is hardly ever obligatory in German.

(12) Lena hasst sich/Maria *Naturally Disjoint*
Lena hate-3SG REFL/Maria
'Lena hates herself/Maria'

The intuition underlying this study is that cross-linguistic similarities or differences may accelerate or slow down the acquisition of a particular structure. Recent studies have established that bilingual speakers are sensitive to both linguistic systems, that is both systems are activated, even when one of them is not required depending on the context (Hatzidaki et al., 2018, p. 489). It is based on the underspecification found in the Greek Nact that this study, has chosen to focus on Greek, English, and German respectively. The underspecification in Greek along with examples of the unique morphological forms in German and English is summarised in Table 1.5:

Voice alternation	German	Greek	English
Reflexive	Lena wäscht sich	I Lena **plenete**	Lena washes herself
	Lena wash.3SG REFL	the Lena wash.3SG.Nact	Lena comb.3SG.ACT REFL
	'Lena washes herself'	'Lena washes herself'	
Passive	Lena wird gewaschen	I Maria **plenete**	Lena is washed
	Lena become-AUX wash-PAST.PART	the Maria wash.3SG.Nact	
	'Lena is washed'	'Maria is washed'	Lena AUX wash.PAST.PART

Table 1.5 The realisation of passives and reflexives in German, Greek, and English

1.7 Interim summary

The broader linguistic debate seeks to answer questions about the stages in which language acquisition takes place. There are two main camps: one that supports the innateness of language and the universality of its developmental stages and one that supports the significance of rich input and frequency. In order to answer these questions, one has to carefully design experiments that tap into the mechanisms of acquisition that are available to the learner at each developmental stage, since some phenomena are thought of as late and some as early in terms of when children

achieve adult-like mastery. This study is concerned with the acquisition of reflexives and passives. The former have been found to be acquired early that is, at around the age of three and the latter have been found to be acquired late that is, at around the age of five or later depending on the language.

Specifically, we looked at the acquisition of reflexives and passives in Greek, German, and English within three children populations between the ages of four and eight: Greek monolinguals, Greek-German bilinguals, and Greek-English bilinguals. We looked at both their comprehension and production skills in order to accurately capture the trajectory of the acquisition of the two structures within bilingual populations. This study hoped to bridge the gap in research on reflexives and passives in bilinguals and complement the extensive research that has been undertaken on these phenomena both within monolingual adult and children populations.

The rationale for choosing this combination of languages lies in the fact that Greek does not have a dedicated morphological form to distinguish the reflexive from the passive but rather relies on an underspecified form using the non-active Voice which makes the acquisition of passives more delayed than in English and German. In contrast, German and English use periphrastic means to express passives and reflexive pronouns to mark reflexivity (reflexive pronouns are obligatory in German but not in English).

As it was explained, transitivity alternations mark a shift in Voice. Transitivity in and of itself, forms one of the pillars of most grammatical processes and has been defined both formally and semantically by numerous linguists. The two transitivity alternations dealt with in this study belong to the category of *detransitivising* alternations as the number of overt arguments required by the verb is reduced.

Furthermore, the case of the Greek non-active Voice was presented in detail along with proposals for its derivation and analysis. Finally, a detailed account of passives and

reflexives in the three languages under investigation was presented. In the next Chapter, some of the seminal studies and related work in the field are presented followed by a discussion of the acquisition of Voice in both monolingual and bilingual populations.

Chapter 2

Theoretical background and related work

2.1 Introduction: Seminal literature in the field

To begin with, as it has already been mentioned, Voice in transitivity alternations has been investigated extensively within first language acquisition research and there is a growing body of literature on them. Linguists have attempted to decipher where these types of transitivity alternations are generated, the different kinds of morphology they are assigned in different languages as well as how they function within them. Attempts have also been made at making cross-linguistic comparisons in order to develop a unified analysis for passives and reflexives found in languages all over the world. Since this study is concerned with the active-passive and the reflexive alternations, this chapter will focus on the relevant literature and will provide an overview of all the seminal studies that pertain to it.

Lexical items and structures that are late to be acquired by children are of particular interest to linguists since they pose a challenge for nativist accounts of language acquisition. The natural question that arises is if language is indeed governed by a UG, why are not all of the structures available from the beginning and how can this delay be explained within that system. Specifically passives and their delay have garnered a lot of attention over the

years, being a prime example of just such a structure. Naturalistic data from a number of languages, including English (Horgan, 1978), French (Sinclair et al., 1971), German (Mills, 1985), and Hebrew (Berman and Slobin, 1985), suggests that spontaneous full passives with agent by-phrase, as in (1b), are very rare in child language and remain so between the ages of four (English, German) and eight (Hebrew) depending on the language the child is acquiring.

Linguistic studies have attempted to find and explain the underlying structures involved in the acquisition of passives and reflexives among others in an attempt to explain what makes the former late and the latter early in acquisition (Borer, 2004; Gleitman, 1990; Grimshaw, 1981; Pinker, 1984; Randall et al., 2004; Tomasello et al., 1998). The investigation of passives and reflexives falls within the larger investigation of when and how children acquire transitivity alternations and has long been debated within the language acquisition literature. The question of how and when *bilingual* children acquire transitivity alternations less so. It is this gap that this study hopes to bridge. Linguistic data points to a discrepancy with regard to the timeline of the acquisition and mastery of passives cross-linguistically. For the most part, passives have been found to be acquired around the age of five.

Initially, I will present some of the broader theoretical context along with the analyses that have been put forward. At a later stage, I will focus on the analyses that have been proposed to capture the structure of reflexives and passives in languages such as Greek, German, and English. The Chapter is structured as follows.

Section 2.2 presents well-known hypotheses such as *Syntactic bootstrapping* and *Semantic bootstrapping*; these are explained and tied into the more specific discussion of the acquisition of passives and reflexives.

Section 2.3 presents examples of the different morphological markings of transitivity alternations both cross-linguistically and specifically for Greek, German, and English. It rounds off with the theoretical literature on the morphology of Voice.

Section 2.4 introduces the general theoretical framework for the derivation and acquisition of passives and reflexives cross-linguistically. Seminal studies are discussed: starting with Wexler's Maturation Hypothesis, his traditional notion of A-chains and continuing with studies that have further built on this hypothesis by testing it in different languages. Finally, it presents some studies that support a usage-based explanation for their delay. It rounds off by discussing a number of studies on the acquisition of reflexives.

Section 2.5 discusses the literature on how these alternations are acquired within bilingual populations and highlights the dearth of such studies within children bilingual populations.

2.2 The acquisition of argument structure

There are two prevalent hypotheses that attempt to explain how children acquire argument structure:

- The semantic bootstrapping hypothesis (Grimshaw, 1981; Pinker, 1984) and
- The syntactic bootstrapping hypothesis (Borer, 2004; Gleitman, 1990)

Semantic bootstrapping, as the name denotes, prioritises the acquisition of semantics over syntax in an attempt to explain how children formulate grammar rules during first language acquisition. Pinker (1982) proposed that children are able to classify words based on their semantic properties. This ability is inherent and enables the child to form broad conceptual categories that they associate with objects and actions in their environment. These semantic categories form a springboard through which children are then able to infer syntactic categories such as *noun* or *verb*.

Syntactic bootstrapping, on the other hand, prioritises the acquisition of syntax over semantics; this hypothesis is also based on the idea that there are innate links

between syntax and semantics. This hypothesis claims that children learn words in their native language by initially forming syntactic caterogies. They then use these categories to make inferences about the meaning of those words. Gleitman (1990) was one of the first to propose that syntax offers the child a way into semantics. This was corroborated by an earlier study (Landau and Gleitman, 1985), which found that blind children used syntactic cues when acquiring verb meaning.

Finally, previous accounts on the acquisition of argument structure supposed that all of the necessary information was included within the lexical entry itself (Jackendoff, 1990; Levin et al., 1995) while alternative accounts suggested syntax determines argument structure (Borer, 1994; Tsimpli, 2006).

2.3 The morphology of transitivity alternations

2.3.1 The morphology of passives and reflexives

As it has already been mentioned, Voice alternations and their morphology are the focus of this study. Specifically, we investigated the active-passive (13a, 13b) and the reflexive alternations (14).

(13) a. Lena washed her doll

b. The doll was washed by Lena

(14) Lena washed herself

As it was mentioned in Section 1.6, the reflexive alternation can be ambiguous in English between a transitive and a reflexive reading without the *-self* pronoun. In German, this ambiguity is avoided because the use of the reflexive pronoun *sich* is obligatory in reflexive constructions. In Greek, reflexive verbs share the same Non-active morphology with passives, and the latter have been argued to develop late in Greek, and cross-linguistically.

Passives are a complex structure that involve a shift in agent marking whereby the agent (or external argument) is backgrounded while the patient/theme (or internal argument) is foregrounded. Nonetheless, the external argument of the verb is implicitly present, as it is semantically and syntactically active. This is suggested by a number of well-known tests, such as the licencing of purpose clauses, agentive by-phrases, agentive adverbs, or instrumental phrases. Reflexives, as it was explained in Section (1.6) involve an agent and a patient that make reference to the same entity, the single DP argument.

Regarding the derivation of passives and reflexives, Alexiadou proposes that there are two distinct Non-active Voice heads implicated in argument structure alternations, namely Passive and Middle (2014a). According to this analysis, "the passive attaches outside the domain that introduces the external argument and thus has as its input a transitive structure." This applies to German among other languages. The middle is located lower, or, as she puts it, "it is the nonactive counterpart of Voiceactive." This analysis is shown below (Alexiadou, 2014a):"

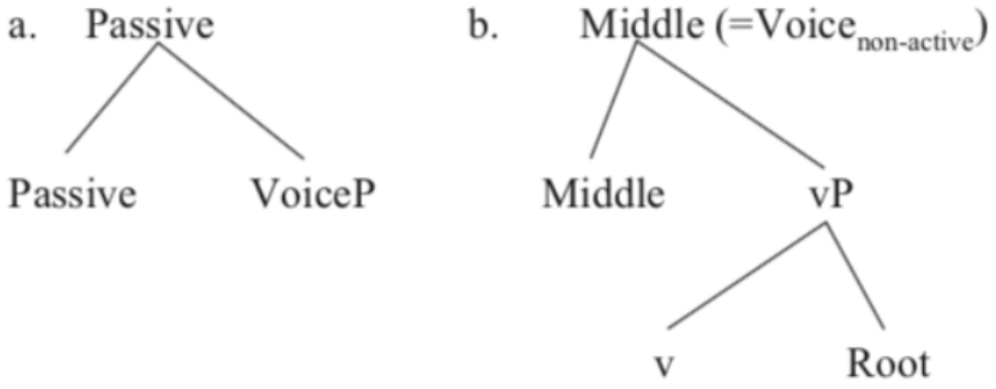


Fig. 2.1 Alexiadou's (2014a) analysis of the Voice head

2.3.2 The morphology of passive and reflexives in Greek, German, and English

In this section, I will place emphasis on the morphological similarities and differences among the three languages under investigation. Additionally, I will discuss the analyses that have been forward specifically with regard to the derivation and interpretation of reflexives and passives in these three languages.

Examples of what morphology passives and reflexives employ in English were given in Table 1.5. What is crucial to remember here is that German reflexives employ a light reflexive pronoun *sich* or a SE-Anaphor. The passive is built on the basis of an auxiliary, werden, and a past participle. Moreover. Greek reflexives and passives share the same synthetic Non-active morphology that is marked on the verb (Alexiadou and Anagnostopoulou, 2004; Rivero, 1992; Tsimpli, 1989).

The differences in how Greek, German, and English express reflexives and passives are summarised in Table 2.1. These will be explained in more detail in the next section.

Languages	Reflexives	Passives
Greek	Nact	Nact
German	active Voice + sich	werden + past part.
English	active Voice + -self	be/get + past part.

Table 2.1 Morphological differences in Greek, German, and English passives and reflexives

2.3.3 The theoretical background of Voice morphology

Within the Government and Binding framework, the standard analysis of the passive is based around three principles (Baker et al., 1989; Embick, 1997):

1. the passive morphology absorbs the accusative case

2. the passive morphology absorbs the external theta-role

3. the internal argument that functions as the grammatical subject moves to the subject position and gets nominative case

This analysis is captured in (15):

(15) [$_{T/IP}$ The article$_i$ was [$_{VP}$ written t$_i$ by Eleni]].

In Chomsky's (1981) Government-Binding analysis (see also Jaeggli 1986), verbal passives are derived through the movement of the NP to subject position and through the absorption of the accusative case. The passive morpheme absorbs the theta-role of the external argument. As Demuth puts it, "the formation of verbal passives critically involves movement of the NP from [NP, VP] position (as the object of the verb) to [NP, S] position (as the subject of the sentence), where it then receives nominative case. When movement of the NP occurs, a coindexed trace **e** is left behind, thus constructing an argument-chain (A-chain)" (Demuth, 1989, p. 57). This analysis is illustrated in (16a) and (16b).

(16) a. Lena tore the doll

b. The doll$_i$ was torn **e**$_i$ (by Lena)

(17) The doll was torn/white (*by Lena)

With regard to adjectival passives, the most prominent analysis is lexical and not syntactic (see Bresnan (1982); Wasow (1977); Williams (1981) for more information). In other words, adjectival passives do not have a thematic subject (they also do not generally take by-phrases), the accusative case is eliminated (not absorbed like in the case of verbal passives), and the theta-role of the NP is externalised (moves to subject position). Unlike the verbal passive in (16b), the adjectival passive in (17) has no coindexed A-chain (which means that no movement takes place) and does not allow a by-phrase. In other words, torn functions just like any other adjective (Demuth, 1989, p. 58).

Kratzer (1996) in her seminal paper developed a neo-Davidsonian association of external arguments in the syntax. Based on this account, external arguments are not

arguments of the verb; they are introduced by a special VoiceP. Kratzer does not delineate the semantics for the passive Voice head, but her discussions suggest that it is the same as that of the active Voice head. What distinguishes the two is the fact that active Voice typically takes an overt NP as its specifier whereas passive Voice is existentially bound. The presence of Voice in the syntax of passives is substantiated through languages such as Greek which employs Non-active morphology to express the passive (Rivero, 1990):

(18) [VoiceP Non-active [VP]]

This analysis holds for Greek reflexives as well according to Alexiadou and Schäfer (2012) and Embick (1997, 2004) among others. These authors support that the morphology of Voice, and whether or not it will be realised as Nact, depends on whether there is no overt external argument that is realised as a Nact Voice head.

However, Chierchia (2004); Reinhart and Siloni (2004); Tsimpli (2006), propose a different analysis: they treat reflexives separately and have been pursuing an unergative analysis.

(19) [v/VoiceP DP [v/Voice <1> v/ Voice [VP V<2>]]]

According to this analysis, the single argument is generated as a deep subject through a de-transitivisation process that eliminates the internal argument. According to the analysis in (5), v has an agentive feature which is attracted by the DP subject in the specifier of vP and is thus the true external argument. The remaining theta- feature is attracted by Voice. Given the ban on lexicalisation by a DP, the LF interface has two theta-features to interpret in the verbal domain. The reflexive interpretation is the result of the DP attractor interpreting both features in this domain (Tsimpli, 2006). What is more, in their analysis, the single argument is generated as a deep subject. Crucially, this means that in languages such as Greek, passives and anticausatives share morphology, but also an intransitive syntax. The issue remains whether naturally reflexive verbs are unergative or unaccusative.

What is more, the analysis of the German passive and reflexive structures is quite different, as all alternations involving *sich* have been argued to be ordinary transitive

constructions. As summarised in Alexiadou and Schäfer (2012), evidence for this claim comes from the fact that i) the reflexive element *sich* behaves like an object pronoun, not like a verbal affix or a clitic (Fagan, 1992; Sells et al., 1987; Steinbach and Gärtner, 2000; Steinbach, 2002) and ii) *sich* has case (Fanselow, 1991). In ordinary reflexive constructions *sich* carries an independent theta role and it is also semantically an argument (Doron and Hovav, 2007). That is to say, both an agent and a theme can be focused independently in reflexive constructions in German. This argues against an intransitivity account as well as a bundling account whereby one syntactic argument gets assigned two thematic roles.

(20) Morgens wäscht sie sich immer/erst mal selber
at.morning wash-3SG she REFL always/first-of-all self
'In the mornings she washes herself (always/or emphasis on herself)'[1]

To sum up, the theoretical literature on Voice has not yet reached a consensus as to the proper characterisation of the structures that surface with special morphology. In addition to this, languages show significant syntactic variation concerning Voice formation; this further complicates the matter of reaching a consensus over the proper analysis of Voice structures. The approaches towards the analysis of Voice delineated above, raise questions for language acquisition, especially bilingual, which are under-researched. The cross-linguistic differences discussed here suggest that a bilingual child must learn subtle facts about the presence vs. absence of SE-anaphors and Non-active morphology, and how these work in the three linguistic systems namely, English, German, and Greek. The questions this study partly seeks to answer are associated with these different Voice systems. That is, assuming that both SE-anaphors (German, English) and Nact morphology (Greek) are involved in Voice alternations, but are subject to different syntactic analyses, a number of questions arise with regard to the acquisition of Voice. The research questions will be presented in the next chapter in detail.

[1] agent focus: She washes herself, no-one else washes her. (context: She is a disabled patient)
theme focus: She washes herself, she washes no-one else. (context: She is a nurse)

2.4 Literature on the acquisition of passives and reflexives

Passives specifically have received a lot of attention within L1 acquisition literature. It has long been observed that children's comprehension of passive structures is delayed across languages (Bever, 1970; Borer and Wexler, 1987; Maratsos et al., 1985). With regard to L1 acquisition specifically, both experimental and longitudinal studies attribute this delay in children's performance on largely two factors (Fox and Grodzinsky, 1998; Hirsch and Wexler, 2006; Maratsos et al., 1985; Maratsos and Abramovitch, 1975; Pinker et al., 1987):

1. The verb type that is, whether it is actional or non-actional
2. The presence of a by-phrase that is, whether it is a short or a long passive

Broadly speaking, it has been shown that the acquisition of actional, short passives always precedes the acquisition of non-actional, long passives; similarly, the acquisition of short passives in general precedes the acquisition of long passives which include a by-phrase. However, this has not been attested consistently and there are some contradicting results in terms of the order of acquisition.

Specifically for short passives, Keenan and Dryer (2006) present examples of different languages showing that they are the most common form of passives cross-linguistically while also presenting examples of languages that do not have passives as well as languages that have only passives of actional verbs. The milestone age of the acquisition of passives is around the age of five in a variety of languages such as English, Greek, German, Dutch, and Hebrew among others (Fotiadou and Tsimpli, 2010; Hirsch and Wexler, 2006; Mills, 1985; Terzi and Wexler, 2002; Zombolou et al., 2010).

In an attempt to explain this delay in acquisition, several researchers, most notably Wexler, (1987; 1992; 2004), have hypothesised that passives are complex structures because they involve A-movement. Chomsky (1981) defined A-movement as a case of the verb not

licencing the grammatical case of its internal argument when passivised which leads to the internal argument being raised to the subject position (or the specifier position of IP/TP) in order to receive grammatical case. This results in a noncanonical word order. According to Wexler, certain UG features are subject to maturation. As a result, the child's grammar may be constrained at different stages of their early development. One such instance is the lack of knowledge of Argument-chains (A-chains).

Borer and Wexler (1987) put forward the *A-chain Deficit Hypothesis* (ACDH). This suggested that children's delay in comprehending and producing passives before the age of five lay in the fact that they cannot form A-chains: they lack the ability to form an A-chain between the displaced object in subject position which leads to the assignment of the incorrect theta-role to the displaced object. In other words, the argument is thematically interpreted in a position other than the position where it is spelled-out. Wexler stresses that this does not imply a lack of principles but is an instance of *maturation* whereby children are unable to form verbal passives unlike adults. This implies that children's grammar is inconsistent with the adult grammar but otherwise consistent with UG. Crucially for the theory, they claim that this early deficit is genetically determined and that A-chains become available to the child some time after the age of five (Bever, 1970; Borer and Wexler, 1987; De Villiers, 1985). However, that is not to say that passives do not receive any grammatical parsing before that age. In fact, Borer and Wexler claim that initially children analyse all passives as adjectival passives; what adults analyse as verbal passives, children understand as adjectival passives; they explain this phenomenon partly as having to do with the ambiguity found in English between the two types of passive.

(21) The door was closed

The sentence in (21) is ambiguous between the *verbal* reading, whereby the door was closed by someone, and the *adjectival* reading, whereby the door was in the state of being closed (Hirsch and Wexler, 2006). Essentially, this is part of the explanation as to why initially children parse verbal passives as adjectival.

Borer and Wexler (1992) adapted ACDH to account for Italian child data that brought maturation into question by showing that Italian children are able to perform participle agreement with clitics and DP objects as early as 2 years old. They suggested the *Unique External Argument Proto- Principle* (UEAPP), which states that:

> Every predicate is associated with a unique external argument. Every external argument is associated with a unique predicate.

By postulating that they effectively claim that the agreement is a result of the child analysing the syntactic subject as an external argument to the verb while analysing the syntactic object as the external argument of the participle. Tsimpli (2006) succinctly summarises the predictions from ACDH and UEAPP combined: "transitives and unergatives should be acquired earlier than passives and unaccusatives ... this prediction holds independently of the morphological properties that may distinguish passives from unaccusatives in a given language." Moreover, Wasow (1977) was also one of the first to claim that children understand verbal passives if they treat them as adjectival passives (22):

(22) The baby was [ADJ combed] by Mary

According to Wasow, children interpret (22) as meaning that the baby was in the state of being combed and do not process the by-phrase that follows the verb. Wasow was also the first to provide a systematic typological distinction between two kinds of passives: adjectival passives that exhibit adjectival properties and verbal passives that exhibit verbal properties. He claimed that children are better able to cope with the former as they are more readily present in their input and do not involve the formation of A-chains.

In a series of experiments, Horgan (1978) found that in English children predominantly produce short passives which have an adjectival (or a stative) reading and are incompatible with a by-phrase. Similarly for Hebrew, Berman and Sagi (1981) found that children predominantly produced adjectival passives even though they are not homophonous with the verbal reading like in English. Maratsos et al. (1985) uncovered a more fine-grained

distinction whereby children aged between four and five produce passives involving actional verbs such as *comb*, *wash*, *scratch* more frequently and accurately than passives involving psychological verbs such as *see*, *feel*, *hear*. However, they showed that children did not differ in their comprehension of long and short passives; the difficulty in production persisted even with 7-year-olds but they reported that accuracy scores improved with age. Crucially, they were able to show that children comprehended and produced the same psychological verbs accurately in the active Voice, strengthening their argument that the difficulty lies with the passive constructions themselves. Along the same lines, Pinker (1984) reported that 3-8-year-olds were more reluctant in passivising non-actional verbs of perception or spatial relationships as opposed to actional verbs.

On the other hand, Fox and Grodzinsky (1998) reject the idea of A-chains and trace the difficulty with passives in children's inability to transmit the external theta role of the predicate to the by-phrase which is independent of A-movement. This predicts that non-actional full passives which include the by-phrase can only be analysed as agentive in the child grammar (Fox et al., 1995). Finally, previous empirical evidence has shown that there is a preferred interpretation when there are no contextual cues to aid disambiguation specifically related to the animacy of the sentential subject (Tsimpli, 2006). This could mean that children are further restricted by the sentential subject as to which constructions they can parse as verbal passives. More recently, Israel et al. (2000) used longitudinal corpora from CHILDES and mapped out the early beginnings of the production of passives in English-speaking children between the ages of 1;08 and 5. They observed that the trajectory they follow is in line with previous findings namely, children's use of the passive moves from adjectival and stative to eventive.

One of the assumptions stemming from the above studies is that passives should become available to children across languages approximately around the same time. However, contradictory evidence comes from languages such as Sesotho spoken in Lesotho and South Africa, which challenges this 'maturation' process.

Most notably Demuth (1989), showed that in Sesotho non-truncated actional verbal passives are acquired early. Specifically, children who are acquiring Sesotho as their L1 can understand and produce verbal passives around the age of 2;8 which poses a stark contrast to English and similar languages. Demuth attributes the early acquisition of passives to language-specific properties, pointing towards the fact that, in Sesotho, passives are very frequent in child-directed speech and present differences in terms of typological properties. Interestingly, Sesotho does not have adjectival passives, only verbal passives which could lead one to hypothesise that it is more straightforward for children to parse them seeing as there is no typological competitor. Here it should be noted that years later, Crawford (2012) shows that Sesotho-speaking children do not perform better on any type of passive in comparison to their English-speaking counterparts, although the frequency of passives in Sesotho child directed speech is ten times greater than in English.

More evidence against the maturation account comes from Dutch. Verrips (2000) investigated passive and unaccusative constructions in Dutch L1 children between the ages of two and six and found that the implicit argument is present even if it is not expressed as an adjunct (by-phrase). Dutch children are unable to distinguish the morphological difference between the passive and the active morphology in their L1 even at the age of six. This claim is relevant to languages like Greek, which can use non-active morphology in passives among other structures. Moreover, Fotiadou and Tsimpli (2010) report similar frequency effects for the acquisition of the Greek passives. Brooks and Tomasello (1999) also showed low production of long passives, while Messenger et al. (2012) showed that the acquisition of passives is a staged process, with acquisition of constituent structure (around age 6) proceeds acquisition of thematic role mappings (around age 9). Added to this, Gordon and Chafetz (1990) conducted a corpus analysis of adult child-oriented speech to three children and they discovered that the rate of passives-per-utterance was merely 36%. From these perspectives, the acquisition of passives is determined by their usage and frequency in the input rather than innate mechanisms subject to maturation.

Further explanations regarding this delay can be found in Hyams et al. (2006). They have argued that children's trouble with the passive stems precisely from a marked arrangement of theta roles. They put forward the Canonical Alignment Hypothesis (CAH), which suggests that in children's early grammar, external arguments such as agents must map on to the subject position (Spec, IP). They claim that the problem does not lie with A-chains but only the specific A-chains whose configuration violates the CAH. In other words, children's interpretation of the passive does not rest on the availability of A-chains, but instead hinges on the match between syntactic and thematic roles.

Kirby (2010), reports that 4-year-old English-speaking children are unable to understand "matrix passives or passives embedded under object control verbs, in an adult-like way" (p. 114). In her study, they interpreted passives as active Voice utterances. However, she notes that, despite their young age, the children in her study performed significantly above chance on the interpretation of passives embedded under raising-to-object verbs (p. 114). These results are interpreted as pointing in the direction of *semantic scaffolding* which claims that children rely on the semantics of the utterances in order to interpret them until their syntactic representations and processing power become adult-like. The semantic scaffolding strategy subsumes the bias towards canonical syntax-semantics matches, as claimed by the CAH, and also makes claims about what children expect the general shape and character of basic clauses to be.

A more recent study by Armon-Lotem et al. (2016), investigated the acquisition of short and full passives by 5-year-olds in 11 languages spanning across three language families (i.e. Indo-European, Finno-Ugric, and Afro-Asiatic) which present differences in the way they construct passives. In particular, they investigated the comprehension of passives and aimed at pinpointing any similarities in the difficulties children face with passives across and within languages. By observing similar problems in the acquisitional trajectory, they would be able to conclude that problems with passives "are not caused by some specific morphosyntactic properties of the languages" selected for the study (p. 28) but rather by a common feature that they all share. More importantly, since passives are used in

language development measures, it would be meaningful to establish whether there are any systematic error patterns or difficulties with passives cross-linguistically which would inform the development and improvement of these measures. They found that children performed really well in the short passives conditions across languages while performance in the long passive conditions was more varied but still above chance. Interestingly, they found that "the direction and magnitude of the differences in children's performance on short and full passives depended on language" (p. 38).

All in all, considering the variation in the timeline of the emergence and, consequently, the acquisition of passives attested across different languages, there is enough evidence that argues against a maturation account. Tsimpli (2006) suggests that "it is possible that maturation and language-specific properties in combination can account for the acquisition of transitivity alternations in a given language ... it is possible that a maturation account can set the lower limit of acquisition before which the derivation is not available, whereas language-specific properties will determine the trajectory/timeline of the development of the specific derivation."

Reflexive constructions have been widely researched within language acquisition studies. It has long been argued that bilingual language acquisition can significantly differ from monolingual language acquisition. Studies have shown that bilingual children are able to distinguish their two linguistic systems from early on and proceed through the same developmental processes as their L1 peers (Meisel, 2001; Müller and Hulk, 2001). The question of how the trajectory of bilingual Voice acquisition differs or compares to that of monolingual Voice acquisition remains under-researched.

Reflexivity is realised using different morphological cues across languages. For example, in Germanic languages reflexivity is expressed through a (in some cases designated) pronoun, in Romance languages reflexivity is expressed through clitics, and, finally, in languages such as Greek reflexivity is marked on the verb using nonactive morphology rendering this form underspecified between a passive and a reflexive reading (or an unaccusative reading).

With regard to the timeline of the acquisition of reflexivity, longitudinal studies have shown that reflexive clitics emerge after subject clitics while in some cases they are simultaneous with non-reflexive accusative (object) clitics while in others they appear later (Fotiadou and Tsimpli, 2010; Schmitz and Müller, 2008). Generally speaking, reflexives have been found to be acquired early in life. Children have been shown to be able to bind reflexives as early as three years old. Some researchers report a delay in acquisition or a total absence of reflexives in early child acquisition. This variability can often be explained by the methods used in the study, the language under investigation and even the experimental questions driving the study. Studies focusing on *Principle A* found that children acquiring English, Italian, Spanish, French as their L1 children between the ages of two and six could successfully bind the reflexive pronoun *-self* to the corresponding antecedent in the same clause (Chien and Wexler (1990); Jakubowicz (1994); McKee (1992); Padilla (1990) among others).

Studies focusing on the difference between naturally (e.g. Lena washed herself) and naturally disjoint reflexives (e.g. Lena hated herself) found that the two types of reflexives in languages such as English occur rarely in early child spontaneous speech (ages 1;6-3;6) (Stojanovic, 2002). Stojanovic analyses reflexives in English as projecting an empty category in object position. She interprets this finding as supporting the maturation hypothesis and predicts its maturation will occur around 4-5 years of age. In languages in which naturally versus naturally disjoint reflexives are morphologically distinct, e.g. Dutch, researchers report that children aged 5;4-6;7, who were tested in a story elicitation task, used other means but not the reflexive zich with naturally reflexive predicates: they omitted or avoided the reflexive zich or used constructions involving body parts (e.g. the boy washed his belly) (Ruigendijk et al., 2004; Stojanovic, 2002).

In languages in which naturally versus naturally disjoint reflexives are morphologically distinct, e.g. Dutch, researchers report that children aged 5;4-6;7, who were tested in a story elicitation task, used other means but not the reflexive *zich* with naturally reflexive predicates: they omitted or avoided the reflexive *zich* or used constructions involving

body parts (e.g. the boy washed his belly) (Ruigendijk et al., 2004; Stojanovic, 2002). Zombolou and Alexiadou (2012c) conducted pilot studies for L1 German children between the ages of three and four and they found similar results with regard to the anaphor *sich* in German reflexives: children omitted the anaphor *sich* with reflexives (e.g. *Sie versteckt (= sie versteckt sich) 'She hides herself') or avoided it and used nouns referring to the corresponding body parts (e.g. Sie kämt ihr Haar 'She combs her hair').

Zombolou and Alexiadou (2012c) also conducted a few pilot studies on Voice acquisition in German by heritage children living in Germany (Zombolou and Alexiadou, 2012a,b). The latter studies revealed that reflexives are not (fully) acquired by age four. Specifically, sequential bilingual German-Turkish children aged 3;1-4;7 and German-Russian children aged 3;10-4;9 demonstrated avoidance strategies by either avoiding or omitting the reflexive anaphor *sich* with reflexives. In addition to this, in a longitudinal study, one simultaneous German-Greek heritage child aged 2;0-2;9 produced German reflexives by 100% omitting the reflexive anaphor *sich* (Zombolou and Alexiadou, 2012a).

Finally, in languages, such as Greek, reflexive verbs are shown to be acquired early in life, earlier than passives despite the syncretism. L1-Greek children aged 3;0-6;0 prefer the reflexive interpretation by far with predicates that are ambiguous between a passive and a reflexive reading, or give better performance on reflexive than on passive verbs, suggesting, among other things, an unergative analysis of reflexives (Fotiadou and Tsimpli, 2010; Tsimpli, 2006).

2.5 Voice acquisition in bilinguals

The literature on transitivity alternations is very sparse for bilingual populations although there are increasingly more studies that choose to focus on different aspects of the 'bilingual grammar'. Indeed, one of the least explored aspects of their grammar is Voice acquisition while a number of studies have investigated aspects such as phonology, adjectival/nominal inflection and code-switching (Montrul, 2011; Polinsky, 2011). Specifically, to our knowl-

edge, there are no known studies that focused on Voice acquisition by Greek-German and Greek-English bilinguals. A few studies have investigated Voice acquisition in Greek by heritage children and adults living in Argentina and Australia (Zombolou, 2011; Zombolou and Alexiadou, 2012a) but for the most part this area of research remains larger under-explored.

2.6 Interim summary

The formation of verbal passive involves movement of the NP from [NP, VP] position (as the object of the verb) to [NP, S] position (as the subject of the sentence), where it then receives nominative case. Transitivity alternations of this kind have been widely researched crosslinguistically and constitute the focus of this study. A number of studies have shown that they appear late in children's grammar.

Syntactic and semantic bootstrapping form two of the most prominent accounts on the acquisition of argument structure. The former prioritises syntax over semantics as a springboard for language acquisition and the latter prioritises semantics. They both pertain to the acquisition of transitivity alternations as they address the broader question of innateness versus frequency in the input.

The morphology of passives and reflexives and the different ways in which Greek, German, and English mark them presents an interesting challenge combination. Greek marks both of them synthetically and the syncretism has been found to be acquired very late in monolingual children. German and English have morphologically distinct ways of expressing reflexives and passives but, similarly to Greek children, German and English children acquire passives late in contrast to reflexives which appear early. Different formal analyses have been put forward to explain the derivation of Voice.

The acquisition of passives and reflexives has been explored from many different angles and has resulted in some rich literature. Most notably, regarding passives Wexler and Borer argue that the late appearance of passives is a result of unavailability of A-chains. Other researchers have argued that this delay points towards the low frequency of passives in children's input.

Bilingual populations have not received as much attention in the literature. In light of accounts of crosslinguistic influence, the question of how bilingual children acquire different Voice systems could have important theoretical implications for the different language acquisition camps.

Chapter 3

The present study

3.1 Introduction: The main aims of the study

This study aims at investigating the acquisition of Voice alternations; it explores how bilingual children, who are exposed to languages that have different morphosyntactic ways of expressing Voice alternations, acquire these Voice systems. In particular, we will investigate the acquisition of reflexives and passives by bilingual Greek-German and Greek-English children. The rationale for choosing these two populations revolves around the morphosyntactic differences found between Greek and both German and English (see 2.3.2). Exploring how these children acquire these different Voice systems will allow us to establish whether these systems develop separately from one another or whether there is an interaction and, hence, there is crosslinguistic influence. And if so, is there positive or negative transfer and in which direction? Is it the dominant language that is influencing the weaker language or vice versa? (Müller and Hulk, 2001). Additionally, do bilingual children exhibit a delay or an advantage in the comprehension of passives? If so, how can we explain this?

Building on this, we are interested in exploring whether different combinations of languages impact the acquisition of these Voice alternations such that the two groups of bilingual children differ from each other but also from their monolingual peers in terms

of comprehension and production. Do bilingual children who are acquiring Greek and German, on the one hand, and bilingual children who are acquiring Greek and English, on the other hand, follow the same trajectory as their Greek monolingual peers? The comparison of the two bilingual populations is motivated by the fact that, for instance, passives are acquired earlier in English than in German than in Greek. In fact, many studies have shown that in English, despite their low frequency in child input, passives are acquired by age three (Wexler, 2004). Similarly for German, passives are acquired by age three or four (Mills, 1985). Finally in Greek, passives have been found to still cause issues at a later age (Tsimpli, 2006).

The idea is to investigate whether there is an advantage for either of the bilingual groups due to the fact that in one of their languages passives are acquired earlier. This question is further motivated by the fact that in these languages passives occur in children's input at different rates; passives are more frequent in English to Greek but still quite rare overall. In German, passives are more frequent than Greek passives which are marked and underused. Therefore, we wanted to investigate the performance of bilingual children and compare it to that of their Greek monolingual peers. Further on the morphosyntactic differences among the three languages under investigation, the Greek-German Voice systems can be said to be proximal to one another as opposed to the Greek-English pair which could be characterised as more distal. Looking at how both German-Greek and English-Greek bilingual children acquire Voice alternations will help us decipher whether their Voice systems develop separately or whether their is crosslinguistic influence.

To that effect, we designed two experimental tasks that tap into the acquisition of reflexives and passives in bilingual Greek-English children in the UK and bilingual Greek-German bilingual in Germany as well as their respective monolingual counterparts in Greece. These tasks specifically aim at testing comprehension and, one of them, production. This study will hopefully fill a gap in the literature by exploring how bilingual children, who are acquiring Greek as their heritage language, acquire and process Voice alternations. The subsequent sections in Chapter 3 delineate the specifics of the current study.

Section 3.2 presents the research questions starting with their rationale and the predictions stemming from them.

Section 3.3 introduces the methodology; it starts off with the participants and their characteristics, it moves on to the pilot study that was conducted to ascertain the clarity and validity of the materials we used and it rounds off with some general comments on the battery of tasks.

Section 3.4 provides a detailed description of the baseline task along with examples of the materials.

Sections 3.5 and 3.6 provide detailed descriptions of the two experimental tasks that we developed for the purposes of this study including the materials that were developed as well as the procedure that was followed in administering them.

3.2 Research questions and predictions

3.2.1 Research question 1

Are bilingual children as delayed as their Greek peers or do they become sensitive to Nact earlier?

Rationale It has been argued that bilingual language acquisition can diverge from monolingual language acquisition significantly. Previous studies have shown that bilingual children are able to distinguish their two linguistic systems in the early stages of acquisition and follow the same developmental trajectory as their L1 peers (Meisel, 2001; Müller and Hulk, 2001). The question of how the trajectory of bilingual Voice acquisition differs or compares to that of monolingual Voice acquisition remains under-researched. In Greek, both of the transitivity alternations under investigation are morphologically marked on the verb using Non-active morphology and are, thus,

underspecified. If the Voice systems that children are acquiring develop independently then there should be no crosslinguistic influence and bilingual children should behave similarly to their monolingual peers. If, however, their Voice systems interact, bilingual children should exhibit a different pattern in how they resolve the Greek syncretism.

Prediction Based on the literature on L1 acquisition of passives, we expected that bilingual children would struggle with the Greek syncretism but we also expected if there is an interaction of the two Voice systems, they would exhibit a different pattern to that of monolingual children and would also make similar errors. If the two systems are separate we expected to see a different pattern in bilinguals but there was no directional hypothesis as to what that would manifest in.

3.2.2 Research question 2

If monolingual acquisition develops differently from bilingual acquisition, how do bilinguals deal with the differences of their two linguistic systems in acquiring the Voice structures?

Rationale Greek Voice alternations represent a case of morphological underspecification, that is, they involve a common syntactic structure spelled-out by Nact morphology (Alexiadou et al., 2015; Embick, 1998). In other words, Greek Nact Voice is underdetermined (Alexiadou and Doron, 2012; Tsimpli, 2006). The German system involves syntactic underspecification of the reflexive element, that is, reflexives involve two distinct syntactic structures realised by the same underspecified element (Schäfer, 2008; Steinbach, 2002). Finally, the English passive system is not synthetic and involves anti-causatives that are formed with the active voice and reflexives that cannot be passivised.

Studies within bilingual populations have established that language users of more than one linguistic system are sensitive to properties of both language systems and

both linguistic systems are activated regardless of whether both are needed in a given context (Hartsuiker et al., 2004; Kroll et al., 2005). Hatzidaki et al. (2018) claims that the "occurrence of syntactic errors that bear the mark of the non-target language provides evidence of a leakage of syntactic information from one language system into another ... by activating words in their two languages, bilingual speakers also activate syntactic information encapsulated in their lemmas through the use of corresponding nodes" (p. 490).

Crosslinguistic influence (CI) happens at the syntax-discourse interface and is the result of multiple grammatical analyses being available in the child grammar. These are licenced by specific syntactic constructions because "language A allows for more than one grammatical analysis from the perspective of child grammar and language B contains positive evidence for one of these possible analyses" (Müller and Hulk, 2001, p. 1). The C-domain (where the pragmatics and syntax interact) is more vulnerable to CI and is likely to be target deviant (Müller and Hulk, 2001, p. 1).

Prediction Based on the above, we expected that bilingual children would exhibit an advantage in the production of the reflexive or the passive due to the fact that their two linguistic systems are employing different morphology to express both reflexivity and passivisation. Specifically, morphosyntactic influence and bi-directional transfer was expected for the bilingual groups. Greek reflexives are syntactically intransitive structures whereas in German and English they are transitive structures. Therefore, if bilinguals perform poorly in reflexives or worse than their monolingual peers, this would point in the direction of morphosyntactic transfer.

3.2.3 Research question 3

What patterns of crosslinguistic influence can be found, if any? Does one pair of bilinguals have an 'advantage' in processing certain Voice alternations in Greek in comparison to the other bilinguals?

Rationale As it has already been mentioned both German and English employ different morphological markers to express the reflexive and the passive respectively. As it was pointed out in Section 2.1, German reflexives make use of an obligatory SE-anaphor while English reflexives use the pronoun *-self* but it is not obligatory to mark reflexivity. Both German and English express the passive periphrastically while Greek has one Non-active form that can be analysed as either passive or reflexive depending on the context. We also note that the diachronical evolution special Voice morphology is reflected in L1 acquisition (Meisel, 2011) which would also give precedence to the acquisition of the reflexive structure over the passive. We know that reflexives are common in children's input, especially inherently reflexive verbs such as *wash*, *comb*, *dry* or reflexives such as *hide one's self*. We also know that passives are underused and are not frequently found in children's input. Children acquire Principle A early in life and therefore reflexives are expected to be acquired early in life (around two years old). Greek reflexives are intransitive structures and therefore not subject to Principle A.

Prediction Based on studies that show reflexives are acquired early in German and English and that children can bind the anaphoric reference as early as three years old, we expected that they would perform better at reflexives compared to their Greek peers. We further expected that Greek-German bilinguals would outperform Greek-English bilinguals due to the saliency of the reflexive construction in German.

3.2.4 Research question 4

Are passives the hardest structure to acquire for bilingual children?

Rationale Research in bilingualism has established that bilinguals are more delayed in production and have half the size of vocabulary in comparison to their monolingual peers. In light of the fact that the Greek syncretism poses a challenge even for Greek monolingual children, we wanted to investigate whether bilingual children are more

delayed than their monolingual peers of whether they are comparable in how they perform in passives. German reflexives are transitive structures in which the anaphor *sich* surfaces as an object. In comparison to active, transitive structures, passives are more complex morphologically because they involve mapping of two different thematic roles (by-phrase). Thus, passives are acquired later than reflexives because children would need to have already mastered both the morphosyntactic constituent and the thematic structures as well non-canonical theta-transmission (non-agentive passives). Hence, reflexives are expected to be acquired around the age of two (or later) and passives around the age of five.

Prediction Based on the literature on L1 acquisition of passives, we expected monolingual children within our age range (4-8) to struggle with passives. We expected that they would perform better in reflexives than in passives while at the same time we expected that bilingual children would perform equally poorly in passives.

All of the above research questions are addressed in both experimental tasks.

3.3 Methodology

3.3.1 Participants

Greek-German and Greek-English bilingual children were recruited in Berlin, Germany, and Cambridge and London, UK respectively. The recruitment took place in bilingual nursery and primary schools in both countries. Greek monolingual children were recruited in Thessaloniki, Greece. The recruitment took place in a monolingual primary school. Parental consent as well as consent from the respective schools was collected for each child that participated in the study.

Moreover, the bilingual children were selected based on the following criteria:

- they were exposed to Greek since birth

- they were exposed to either English or German since at least the third year of their life
- they were productive in Greek that is to say, they could communicate in simple sentences in Greek

Six children were excluded from the study because they were not verbal in Greek and did not produce a single word in the baseline task. Our final sample consisted of a total of 120 children (40 Greek-German bilinguals, 40 Greek-English bilinguals, 40 Greek monolinguals) aged from four to eight years (mean age = 6.1 years, range = 4.0-8.9), all typically developing and no known neurological, hearing, or learning disorders. Additionally, 40 Greek monolingual adults (mean age = 20.3, range = 20-25) were recruited as a control group. The child participants in the study were matched in chronological age across populations. An analysis of variance (ANOVA) indicated no significant differences in age among the groups, $F(2, 2877) = 1.75$, $p = 0.17$. Table 3.1 provides the descriptive statistics for all groups including the control group for their age, age of onset (AoO), vocabulary scores, socio-economic status (SES), and length of exposure (LoE) to Greek in detail. This information (except for vocabulary which was measured using the baseline task) was collected in the form of a questionnaire that was based on the Alberta Language Environment Questionnaire (Paradis, 2011) and the Alberta Language Development Questionnaire (see Antoniou and Katsos (2017); Paradis et al. (2010)) and adapted for the purposes of this study as well as for the age range of the participants. Specifically, SES was measured as the composite z score of parental education and SES questions. Based on that, participants were arranged from lower to higher socio-economic status. Specifically, information about LoE was collected measured through questions about the frequency with which parents, guardians (including grandparents) and other siblings spoke Greek to the child on a scale from 1 (English/German almost never/Greek almost always) to 5 (English/German almost always/Greek almost never). Output was measured as the frequency with which the child spoke Greek to the same

family members and guardians. Greek language use at home was then calculated as the mean proportion of Greek input and output that the child received from and directed to other family members (mother, father, siblings and grandparents).

The age range of the groups was determined by the age of acquisition of the specific structures under investigation. In particular, studies have shown that reflexives are acquired around age three in all of the languages the children of this study were exposed to, while passives have been shown to be acquired relatively late in comparison with age five being reported as the earliest age of acquisition for English and German. Greek children have been found to struggle with passive constructions around age seven and even then we cannot speak of adult-like mastery.

	DE-GR (*n* = 40, 20 female)	UK-GR (*n* = 40, 16 female)	GR (*n* = 40, 22 female)
Mean chronological age (years)	6.09	6.15	6.15
SD	1.06	0.94	0.22
Range	4.00-8.9	4.4-8.4	5.7-6.6
Mean vocabulary score	23.40	25.47	38.47
SD	10.25	12.08	5.64
Range	8-42	2-47	28-47
Mean age of onset	0.93	1.33	NA
SD	0.96	1.25	NA
Range	0-3.0	0-3.5	NA
SES	-0.279	0.305	0.007
SD	1.58	1.53	1.45
Range	-4.37-1.82	-3.03-2.63	-3.44-2.63
LoE	10.47	11.08	NA
SD	3.04	2.64	NA
Range	3-15	7-15	NA

DE-GR = Greek-German bilinguals; UK-GR = Greek-English bilinguals; GR = Greek monolinguals

NA = Not Applicable

Table 3.1 Descriptive statistics in children groups

Recruitment was not too stringent with regard to the language environment in which the children were growing up; due to increased mobility and migration in recent years, some of the families that were recruited had moved to their respective countries within the first, second, or third year of their child's birth. These families were included in the study. Specifically, 61% of the Greek-English bilinguals were born and are being raised in the UK; they are either being raised with Greek only at home but are attending bilingual Greek-English nursery schools or they are being raised in a bilingual setting (with one

parent speaking Greek and the other parent speaking English) and are also attending bilingual Greek-English nursery schools.

As for the Greek-German bilinguals, 86% of them were born and are being raised in Germany; they are either being raised in a Greek-only setting but attending bilingual Greek-German nursery schools and some of them are growing up in a bilingual setting with one parent speaking the heritage language (Greek) and the other parent speaking the environment language, in this case German.

With regard to the socio-economic and educational background of the children participants, the monolingual children were recruited from the School of English Experimental primary school in Evosmos, Thessaloniki; the Greek-English bilingual children were recruited from one Saturday school in Cambridge, UK and two state nurseries in London. The adult controls all held a University degree.

Before approaching schools for recruitment, the experimenters underwent DBS checks in all of the testing countries. In addition to this, ethics approval was obtained by the Department of English and American Studies at the Humboldt-Universität zu Berlin for recruitment in Berlin, Germany; by the Department of Modern and Medieval Languages at the University of Cambridge for recruitment in the wider area of Cambridge, UK; by the Governing Board of the Experimental Primary School of Evosmos. Finally, both teacher and parent consent was obtained in all of the testing locations.

3.3.2 Sample characteristics

When working with bilingual populations, or children populations in general, homogeneity is an issue that often poses a challenge. Finding and recruiting homogeneous groups of bilingual children is a challenge which is mitigated by a number of variables. Firstly, working with children, as do all studies involving human participants, entails asking for ethics approvals from the respective institutions which assess the risks and attainability

of the study as well as parents and schools. Schools have to adhere to strict curricula and policies which may prohibit their participation in linguistic studies.

Lotem succinctly summarises some of the main characteristics to take into account when recruiting bilingual populations especially. Namely, "social status (e.g., immigrant, indigenous, privileged minorities), differences in age (early/late age of onset of L2 acquisition), birth order, family size, acquisition order (simultaneous/sequential), degree of exposure, acquisition contexts (e.g., one parent for each language, one language at home vs. another language at kindergarten or school), and relative prestige of languages" (Armon-lotem, 2012, p. 1).

All of these variables can pose a formidable challenge when undertaking studies such as the present one. As it was mentioned above, recruiting for this study took place in three different countries: England, Germany, and Greece. The 40 monolingual children and the 40 monolingual adults who were tested in Greece formed relatively homogeneous groups in terms of background, SES, and age since all of the children were tested in the same school and all of the adults controls were tested at the Aristotle University of Thessaloniki. Characteristics such as birth order or family size were not considered for these two groups.

3.3.3 The pilot study

Before the main study was conducted, 12 children (mean age 5), all monolingual speakers of Greek were recruited to pilot the two experimental tasks and to check for errors in methodology and in the design of the tasks. The children were typically developing and had no known neurological, hearing, or learning disorders. The results of the pilot study were satisfactory and minor changes in the order of presentation of some of the items were made. The data collected for the pilot study was only used as a guide regarding the efficiency of the tasks and the validity of the items and was not included in the results of the present study.

3.3.4 Battery of tasks

Before delving into the design of the experimental tasks, some general information on the testing procedure and protocol is presented below.

Firstly, to ensure that no unfair advantage was given to any children in any direction and in order to set a baseline, we started all testing sessions with the Renfrew's (1998) expressive vocabulary task, a picture-naming task which has been adapted for Greek by Vogindroukas et al. (2009). We tried to match participants across groups based on their scores and to include children who were at least productive in Greek. This was especially important since a lot of parents had deemed their bilingual children to be fluent in Greek during recruitment when, in fact, some of them were non-verbal in Greek or exhibited very low productivity scores in Greek compared to their monolingual peers (see Section 3.4 for more details).

Secondly, the order in which the experimental tasks were administered was counterbalanced across participants. Half of them (= 20) started off with the first experimental task (3.5) and half of them started off with the second experimental task (3.6). In order to ensure objective results the exact same procedure was followed for all of the participants across groups.

The two experimental tasks that were administered are: a) the truth-value judgement task (TVJT) and b) the act-out task (AOT). These two tasks have both been primarily used in the literature as comprehension tasks. However, for our purposes the TVJT was designed in such a way that for some of the items, it resembled a forced-production task in an attempt to elicit the studied structures in Greek or to at least pinpoint when they become productive. Section 3.5.1 provides detailed information on the variables we tested as well as insight as to how we designed the test materials.

Both experiments were designed for the purposes of investigating the acquisition of Voice alternations in bilingual children whose first language is Greek (in the case of sequential bilinguals) and either Greek-English or Greek-German (in the case of simultaneous

bilinguals). The rationale for the TVJT was based and adapted from Crain and Thornton (1998); novel video clips were created for the test items for this task. The rationale for the act-out task was also was based and adapted from Crain and Thornton (1998) as well as from Winskel (2004); the stories created for this task revolved around three sets of Playmobil toys.

With regard to the general testing protocol, each child was tested in a quiet space either at their school or family home and sat at a desk facing the laptop during the TVJT and facing the Playmobil toys during the AOT, next to the experimenter. The premise of the session with the experimenter was that they were going to play two games together. Once they agreed to play, the child and the experimenter went into the quiet space. The session started off with the experimenter explaining the rules of the games in the order in which they were 'played'.

Each task had trial examples before the actual testing began to ensure that the child had understood the procedure for each task and that they had time to ask for clarifications (see Sections 3.5.2 and 3.6.2 for the experimental procedure followed for each experimental task). Where further elucidation was required, this was given through the repetition of the trials along with more verbal explanation by the experimenter. The children were informed at the beginning of play that they could stop playing the games at any point during the session. In cases of fatigue, or lack of concentration the children were dismissed or were given a short break and the tasks were resumed afterwards. All children were rewarded with a sticker for their participation.

The rationale in choosing to base our investigation on two comprehension tasks lay in the lack of comprehension studies with regard to transitivity alternations in Greek bilingual children. In addition to this, the few studies that had focused on bilingual populations (or monolingual populations) had employed production tasks. Given that in Greek, passives are a late phenomenon (see Section 1.6) in contrast to English and German, we hypothesised that checking for comprehension or sensitivity to the Greek Nact can capture the beginnings of its acquisition before they become productive.

Prior to the session, parents and caretakers were asked to fill out language background questionnaires which informed our understanding of language use at home and in school. Specifically, the questionnaires included questions about (for more information about the questionnaires see Appendix A):

- language use with family members at home (since birth and until the time of filling out the questionnaire)
- language use between parents, caretakers, relatives, and other people living at home (in the case of bilingual families)
- children's consistent input and output in Greek (as estimated by the parents, or other guardians)
- parents' estimation of children's Greek comprehension and production skills (or in each of their two languages in the case of bilingual children)
- time of immigration to the UK or Germany (if children were not born in the respective countries)
- information about parental education
- information about the family's socio-economic status
- information about exposure to written Greek through reading

We found that the sequential Greek-English bilingual children who were born in the UK were exposed to Greek at the mean age of 15 months and had a mean LoE to Greek of 4.5 out of 15 on our questionnaire scale which meant they were being consistently exposed to more English than Greek. The sequential Greek-German bilingual children who were born in Germany were exposed to Greek at the mean age of 10 months and had a mean LoE to Greek of 4.7 out of 15 on our questionnaire scale which meant that were being consistently exposed to more German than Greek. Finally, regarding the socioeconomic

status of the families, it turned out that all of the children, including monolingual children, who participated belonged to mid-to-high SES families.

3.4 The baseline task: Renfrew's expressive vocabulary task adapted for Greek by Vogindroukas et al.

As it was pointed out above, all of the sessions started off with the administration of the picture-naming baseline task which is the only currently available task for this age range that assesses productive vocabulary in Greek (Vogindroukas et al., 2009). This task is based on Renfrew's expressive vocabulary task (1998) and adapted for Greek by Vogindroukas et al.

This task is administered as a PowerPoint presentation on a laptop and consists of a total of 50 black-and-white pictures. The children are asked to name the object that is depicted on each slide. The task does not have a discontinue rule and all items need to be administered. The items become progressively harder conceptually and vocabulary-wise, starting off with pictures for *keys* and *snake*, moving on to pictures for *crocodile* and *kangaroo*, and finishing with pictures for *steeple* and *lighthouse*. Due to the increasing complexity of the words depicted, in cases of non-verbal bilingual children who did not produce a single word after the first 10 items, which correspond to frequent Greek words, we stopped the task. Fig. 3.1 provides an overview of the increasing complexity of the pictures included in the task.

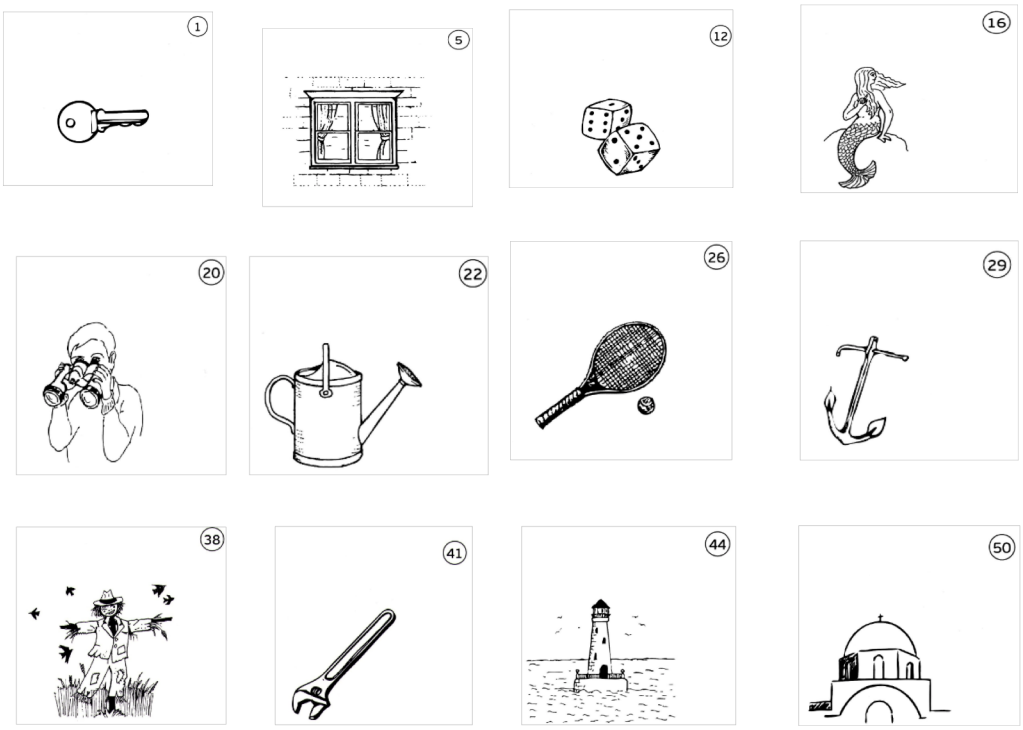


Fig. 3.1 Expressive vocabulary task

At the beginning of each testing session, each participant's lexical abilities in Greek were evaluated. A one-way ANOVA with the raw vocabulary scores as the within participants factor and Group as the between groups factor revealed a main effect of Group $F(2, 679.7)$ $p < .001$. Post-hoc Tukey tests revealed that the Greek children had a higher accuracy of 77% in the Greek expressive vocabulary task than their Greek-German peers ($p < .001$) who achieved 50%. Greek children were also significantly better than their Greek-English peers ($p < .001$) who achieved 47%. The variability in individual responses is shown in Fig. 3.2 and it provides a better picture of the significant differences among the groups of children.

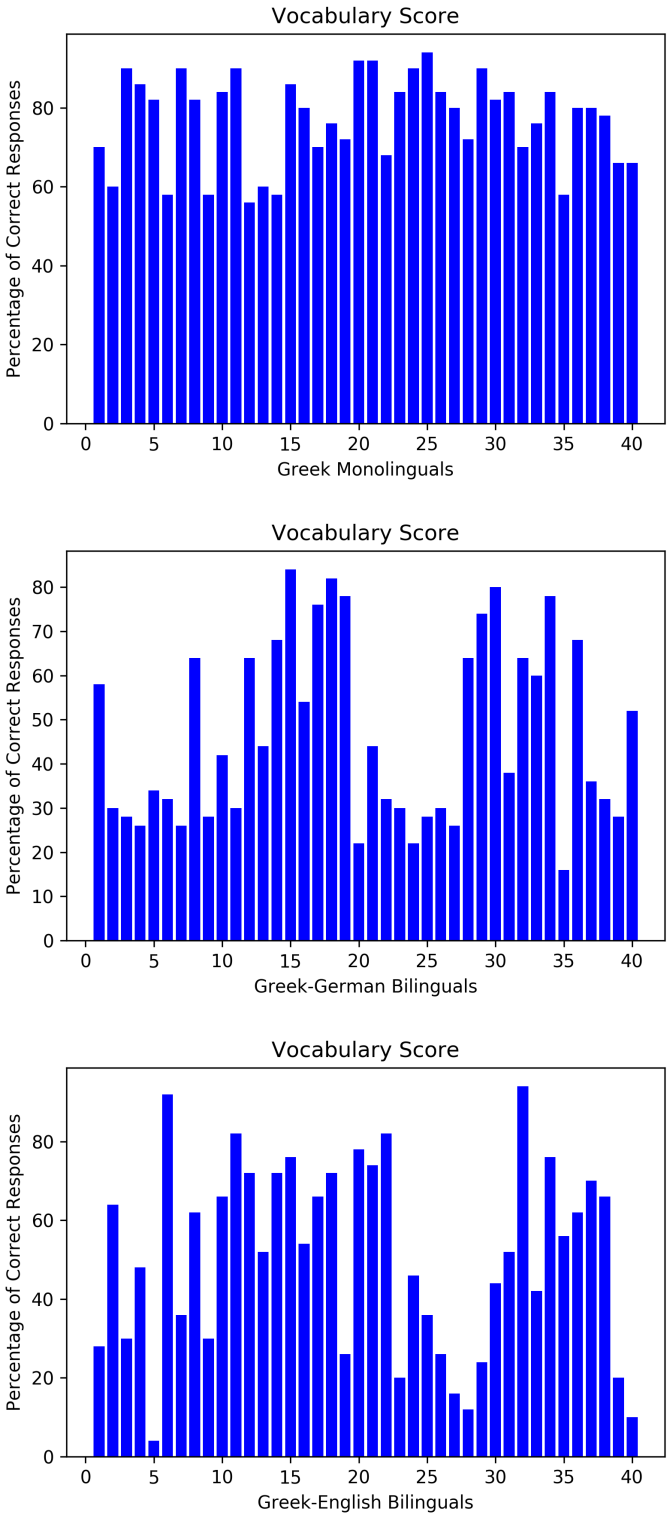


Fig. 3.2 Individual vocabulary scores of all children populations

3.5 Task I: The truth-value judgement task

As it has already been mentioned, the first experimental task was based and adapted from Crain and Thornton (1998).

Rationale Truth-value judgement tasks have been extensively used in the literature as they allow researchers to tap into "which meanings children can and cannot assign to sentences" (Crain and Thornton, 1998, p. 209). For our purposes, the TVJT will allow us to observe how many interpretations children attribute to the Greek syncretism in specific contexts whether it be more or fewer than those adults attribute to it. The dependent measure is whether the child correctly comprehended the statement made by the puppet (and secondly, whether the child produced the correct construction if the false statements are used as means to elicit production).

Advantages The TVJT allows the experimenter to control both the prompts that is, the sentences the child hears, as well as the meaning attached to them by creating the appropriate context. It also creates a playful, game-like atmosphere so that the child does not feel like she is being tested because ultimately it appears that the judgements of the puppet are under investigation.

Disadvantages The limitation of the TVJT is a practical one: it can be quite time-consuming and if it used as part of a larger battery of tasks, it can be challenging to complete it and to maintain the child's concentration. Because of this, the number of trials that can be included is limited and this is something that was taken into account when designing the trials for our experiment.

3.5.1 Materials

The items in this task have been traditionally presented through a puppet show. However, for this study, novel video clips were created that depicted the actions described by the test items. The video clips that were used for the task were developed as part of the *DFG*

AL 554/7-1; AL554/7-2: Acquisition of Voice. The video clips depicted actions performed by a little boy, his family, and pets. For instance, in some of the videos 'the little boy is sleeping', or 'getting dressed'; in some other videos 'his teddy bear is being washed', 'dried' and so on.

The TVJT consisted of 28 items in total. Four of those items were trials during which the children familiarised themselves with the task. The rest of the items alternated between a filler trial and an experimental trial. This resulted in 12 fillers and the remaining 12 items comprised the experimental items. The 12 fillers included seven active verbs, two were reciprocals, and three were unaccusatives; reciprocals and unaccusatives also use the non-active voice in Greek but were not analysed as part of the experimental items. Out of the 12 experimental items, four tested the so-called *naturally reflexive* verbs which are common in Greek and included verbs such as *comb one's self* and *dress one's self*, four tested less frequent reflexive verbs and included verbs such as *hide one's self* and *scratch one's self*, and, finally, four tested passive verbs in Greek and included verbs such as *to be wiped* and *to be dressed*. Table B.1 presents a full list of all of the verbs used in the trials.

The items that tested the passive were all short passives (they did not include an agentive by-phrase) and had inanimate objects (the teddy bear). All arguments were full lexical NPs instead of pronouns.The items were designed in such a way that the statements the puppet made were true 50% for half of the trials and false for the rest of them. In addition to alternating test items with filler items, the veracity of the statements (whether what the puppet said was true or false) was also randomised.

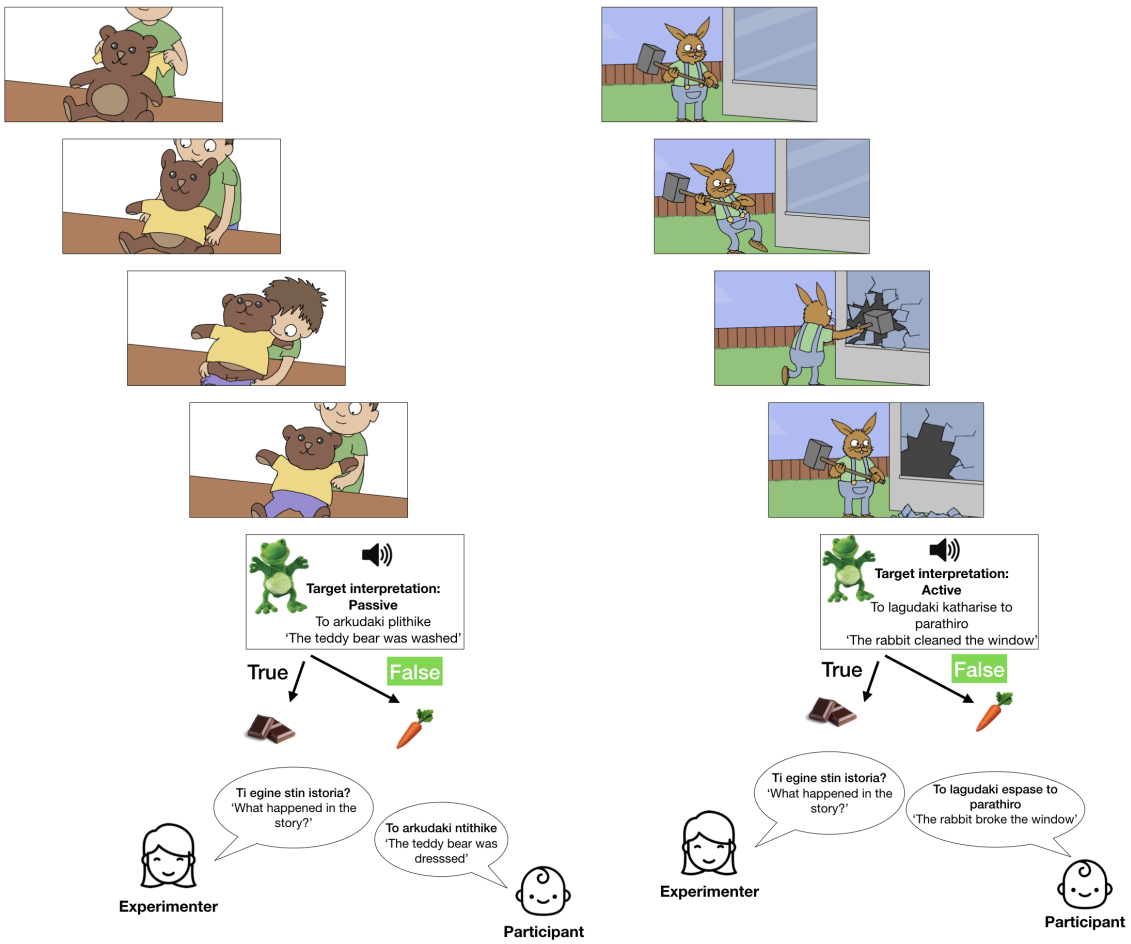
3.5.2 Procedure

The premise of the task was that a frog puppet named 'Elenitsa' wanted to learn Greek; the child was asked to watch the video clips along with the puppet. After each video clip, the child listened to the puppet describe what happened in the story. The child was then asked whether that was correct that is, whether what the puppet described corresponded

to what happened in the story. Traditionally, the child has a choice between a *reward* and a *punishment* for the puppet but we included the notion of a *reward* and the notion of *constructive feedback* instead. The reason for this is twofold: We wanted to avoid the negative associations attributed to the concept of punishment; it has been previously reported that children have found the aspect of punishment more entertaining and would over-select that one over the reward.

In this study, if the puppet was correct the child was asked to reward her for her correct answer by "feeding" her a small piece of chocolate; if the puppet was wrong, she was asked to "feed" her a small piece of carrot (to provide her with a less attractive reward) for her incorrect answer as a way of telling her that she 'needed to study harder'. In the latter case, the child was also asked *what happened in the story?* which formed the forced-production component of the task. The test items were interspersed with filler items in order to check for answer biases and/or lack of concentration. The task required roughly 20 to 25 minutes to complete depending on the participant and the speed with which they were replying/rewarding the puppet.

Two example stories are shown in Fig. 3.3 which presents the video clips scene-by-scene as they unfolded. The item on the left is one of the experimental items testing the passive (prompt: *plithike* = was washed / target interpretation: *ntithike* = was dressed) and gives a false prompt in order to extract the target interpretation. Similarly, the item on the right is one of the filler items that is testing the active Voice in Greek (prompt: *katharise* = cleaned / target interpretation: *espase* = broke) and also gives a false prompt in order to extract the target interpretation. The dialogues in (23) and (24) took place after the child watched the video for the passive and the filler trial respectively.



Left = Passive Voice; Right = Active Voice (filler)
Both of these items give a 'false' prompt

Fig. 3.3 The Truth Value Judgement Task

Example: Passive Voice

(23) *Puppet*: Ksero ti egine stin istoria (= I know what happened in the story).

To arkudaki **plithike** (= The teddy bear **was washed**).

Experimenter: Afto egine stin istoria? (= Is that what happened in the story?)

a) *Child*: **Ne (= Yes).** If the child incorrectly understood that the puppet was correct, the experimenter would prompt the child to 'feed' the puppet what she deemed appropriate, in this case a piece of chocolate.

Experimenter: Ti tha fai i Elenitsa? (= What is Elenitsa going to eat?)

The experimenter would then wait for the child to choose the appropriate 'reward' before moving on to the next item.

b) *Child*: **Ohi (= No).** If the child correctly understood that the puppet was wrong, the experimenter would prompt the child to 'feed' the puppet what she deemed appropriate, in this case a piece of carrot.

Experimenter: Ti tha fai i Elenitsa? (= What is Elenitsa going to eat?)

The experimenter would then wait for the child to choose the appropriate 'reward' before asking the child to say what really happened in the story.

Experimenter: Ti egine stin istoria? (= What happened in the story?)

Child (**target response**): To arkudaki **ntithike** (= The teddy bear **was dressed**).

Example: Active Voice

(24) *Puppet*: Ksero ti egine stin istoria (= I know what happened in the story).

To lagudaki **katharise** to parathiro. (= The bunny **cleaned** the window).

Experimenter: Afto egine stin istoria? (= Is that what happened in the story?)

a) *Child*: **Ne (= Yes).** If the child incorrectly understood that the puppet was correct, the experimenter would prompt the child to 'feed' the puppet what she deemed appropriate, in this case a piece of chocolate.

Experimenter: Ti tha fai i Elenitsa? (= What is Elenitsa going to eat?)

The experimenter would then wait for the child to choose the appropriate 'reward' before moving on to the next item.

b) *Child*: **Ohi (= No).** If the child correctly understood that the puppet was wrong, the experimenter would prompt the child to 'feed' the puppet what she deemed appropriate, in this case a piece of carrot.

Experimenter: Ti tha fai i Elenitsa? (= What is Elenitsa going to eat?)

The experimenter would then wait for the child to choose the appropriate 'reward' before asking the child to say what really happened in the story.

Experimenter: Ti egine stin istoria? (= What happened in the story?)

Child (**target response**): To lagudaki **espase** to parathiro (= The bunny **broke** the window).

Table 3.2 presents an overview of the model dialogue the experimenter held with the child after each item was presented.

Dialogue	**Premise sentence & Test item**
Puppet	Ksero ti egine stin istoria. _____ I know what happened in the story. _____
Experimenter	Afto egine stin istoria? Is that what happened in the story?
Child	a) Yes → Ti tha fai i Elenitsa? (What is Elenitsa going to eat?) Then the experimenter would move on to the next item b) No ↓
Experimenter	a) Ti tha fai i Elenitsa? (What is Elenitsa going to eat?) b) Ti egine stin istoria? (What happened in the story?)
Child	

Table 3.2 TVJT dialogue template

3.6 Task II: The act-out task

This task was based and adapted from Crain and Thornton (1998) as well as from Winskel (2004) and Ambridge and Rowland (2013); the stories created for this task revolved around three sets of Playmobil toys.

Rationale As noted in Ambridge and Rowland (2013), "act-out tasks are generally used to assess children's knowledge of syntax" (p. 155). For our purposes and similarly

to the TVJT, the AOT will allow us to observe how many interpretations children attribute to the Greek syncretism in specific contexts whether it be more or fewer than those adults attribute to it. The dependent measure in this case is whether the child correctly produced an enactment e.g. with the first-named character as the *patient* in the case of passive verbs.

Advantages The AOT allows us to tap into the interpretations and meanings the child attributes to the sentences she hears. The experimenter can control the prompts that is, the sentences the child hears as well as the toys the child is given for each story but not the meaning attributed to them, as the task is after the child's 'default' interpretation. Like, the TVJT, it also creates a playful, game-like atmosphere so that the child does not feel like she is being tested as the entire task in based on the premise of playing with Playmobil toys.

Disadvantages The limitation of the AOT lies in the fact that it is open-ended in terms of possible reenactments. There is no restriction on what they child may reenact with the toys other than the prompt sentences. This may result in difficulty interpreting the reenactments if they are non-target and it was taken into account when designing the materials.

3.6.1 Materials

The AOT revolved around three stories about a little boy, his mum, and their dog and a little girl and her mum. The original stories in Greek along with the English translations below can be found in Table B.3. Each story consisted of six main clauses and each clause began with an NP. Choosing to refer to the subject using full NPs can be unnatural but the reasoning behind it was to avoid ambiguity and make sure the children understood who was being referred to. In order to reduce the unnatural repetition of the subject NP the experimenter allowed for pauses in-between sentences and interacted with the child as she was acting-out the story.

As it was pointed out, interpretation may be hard in cases of non-target reenactments. For this reason, we created these stories to be as semantically simple as possible and did not involve too many toys for the act-outs; the objective was to see how children interpret the Greek Nact. For example, children know that, given a noun-verb-noun string, the first noun (usually) denotes the *agent* and the second the *patient* but in the case of passives these roles are reversed. For the passive items, in cases of non-target items the experimenter asked the child a comprehension question in order to aid the interpretation and the analysis of subsequent error patterns. For instance, in Story 2 if the child incorrectly acted-out *Anna washing herself* (reflexive interpretation) instead of the target which was *the carpet was being washed* (passive interpretation), the experimenter would ask *Who was washed?* For a detailed description of the test and filler items along with the toys, see Table B.2 and for the toys used in each story see Fig. B.2.

3.6.2 Procedure

The premise of the task was that the experimenter and the child were going to play with some Playmobil toys. The experimenter ensured that the child was familiar with all of the toys by naming them as they were taken out of the bag and placed in front of the child. The experimenter would only present the child with the toys that were relevant to each story. The experimenter would try to create a playful atmosphere as she was narrating the stories. After each item, she would give the child plenty of time to re-enact what she heard before moving on to the next item. If the child was unsure, or would not re-enact anything, the experimenter would repeat the sentence one more time and encourage her to use the toys to re-enact it. If the child gave no response then the experimenter would move on to the next part of the story. This task was 10-15 minutes depending on the participant and the speed with which they re-enacted the stories.

3.7 Interim summary

The main research questions pertain to how bilingual children acquire the different morphosyntactic systems that are available in their two languages to express passives and reflexives. Special attention is given to passives because literature on L1 acquisition has consistently pointed out that they are acquired late. We investigated whether bilinguals perform similarly to their monolingual peers in that condition. We further investigated if they show any differences in the errors they make and overall performance. Finally, we wanted to see if there is crosslinguistic influence between the two linguistic systems.

The main predictions are children across populations will struggle with passives. Bilinguals might perform better in reflexives due to the morphosyntactic differences and saliency in their other language. We hypothesised that if bilinguals pattern after monolinguals that implies that their two linguistic systems are interacting.

The participants were recruited in England, Germany, and Greece. Their age range was four to eight years old. We investigated a number of factors that play a role in bilingual research such as AoO, LoE and vocabulary size.

The battery of tasks comprises an expressive vocabulary task in Greek and the two experimental tasks namely, TVJT and AOT. The materials and the procedure were explained in detail. In the next chapter, we turn to the results.

Chapter 4

What we observed: Results

4.1 Introduction

This chapter presents the results of this study. As pointed out in the previous chapter, this study was conducted to answer four research questions with respect to the acquisition of transitivity alternations in Greek-German and Greek-English bilinguals who were compared to their Greek monolingual peers.

Sections 4.2 and 4.3 describes the coding scheme that was adopted for each of the two experimental tasks and how the raw data was processed in order to be able to conduct statistical analyses. In particular, the coding scheme and the levels of the outcome variables are explained in detail.

Section 4.4 introduces the statistical tools that were used to conduct the statistical analyses for this study. It further elaborates on the reasons behind this choice.

Sections 4.5 and 4.6 discuss the results of TVJT and AOT respectively. They present the models that were fitted to the data for each of the outcome variables and also present qualitative information about the participants' performance. At the end of each section, the emerging error patterns are elaborated on.

4.2 Data preparation: Coding and scoring - TVJT

After the data collection procedure was completed, the data was anonymised and coded. To maintain anonymity in accordance with data privacy regulations, all of the participants were assigned code names and only their age was retained for the purposes of the study. Participants' responses were audio-recorded during the TVJT sessions due to the complexity of administering the task: it required simultaneous use of the laptop to present the experimental items, use of the puppet and the experimenter had to ensure that the child selected one of the two "rewards" for the puppet (see the dialogue template for TVJT 3.2). For this reason, the responses were manually transcribed to an Excel sheet offline by the experimenter and the research assistant that assisted with the data collection. Inter-coder reliability for two coders was assessed for a random sample of 15% of the data. The two coders achieved a 96% agreement, with a Cohen's Kappa of .936.

The version of TVJT that was created and used in this study was a measure for two conditions namely, the comprehension and production of the Non-active Voice in Greek. These were coded and scored as follows.

The comprehension condition. All correct responses to *true* statements (i.e. when the puppet made a true statement and the child correctly understood that as being correct by rewarding the puppet with a piece of chocolate) were coded as correct and given a value of '1'. All incorrect responses, or 'error acceptance' instances (i.e. when the puppet made a true statement and the child incorrectly understood that as being false by rewarding the puppet with a piece of carrot), were coded as incorrect and were given a value of '0'. Similarly, all correct responses to *false* statements (i.e. when the puppet made a false statement and the child correctly understood that as being false by rewarding the puppet with a piece of carrot) were coded as correct and given a value of '1'. Finally, all error acceptance instances (i.e. when the puppet made a false statement and the child incorrectly understood that as being true by

rewarding the puppet with a piece of chocolate) were coded as incorrect and given a value of '0'.

The production condition. This condition applies to those trials that were designed such that the statements the puppet made were false. When the children correctly identified those statements as being false (i.e. when the puppet made a false statement and the child correctly understood that as being false by rewarding the puppet with a piece of carrot), they were then asked to produce the correct verb to help the puppet learn Greek (see Scenario 1 above). Their responses were divided and coded into two categories: **a)** all responses the child produced which included the target verb in the target Voice (nonactive or active depending on whether it was a filler or an experimental item) that corresponded to the action that took place in the video, were coded as correct and given a value of '1'. All incorrect responses, the production of the wrong Voice, or the production of something completely irrelevant were coded as incorrect and given a value of '0'. We assigned the label **target production** to this condition. **b)** all responses the child produced which included the target Voice (nonactive or active depending on whether it was a filler or an experimental item) but not the target verb (for instance, instead of *broke* the window, some children produced *ruined* the window), were coded as correct for Voice and given a value of '1'. We assigned the label **target morphology production** to this condition.

Some final notes on coding. The reason for the double coding of the production condition stems from that fact that a lot of children produced the target Voice but not the target verb and it could be argued that verb choice is dependent on the child's vocabulary size and/or the amount of exposure to Greek. If we had coded these responses as incorrect, that would not have reflected their performance accurately, as it would have indicated a very low performance in production overall. Therefore, we decided to reward children for the correct use of Voice in the appropriate context as that demonstrates their sensitivity to it and their mastery of it which, ultimately, lies

at the centre of our research questions. In addition to this, it should be noted that for error acceptance instances (i.e. when the puppet made a false statement and the child incorrectly understood that as being true by rewarding the puppet with a piece of chocolate), the child was not asked to produce the correct verb and these trials were coded as 'not applicable' with regard to production and given 'NA' as a value. Finally, responses containing inter-sentential code-switching or given in either German or English (this only applied to the bilingual populations), responses with missing verbs, or null responses were excluded from the calculations.

Moreover, errors were also coded separately in order to investigate any systematic error patterns, which emerged and were observed consistently across populations to specific items. After the manual transcription, we ended up with the following dependent variables with regard to TVJT (3.5):

- Accuracy scores for the comprehension condition
- Accuracy scores for the target Voice production condition
- Accuracy scores for the target morphology production

4.3 Data preparation: Coding and scoring - AOT

With respect to the AOT, each session was video recorded with the experimenter ensuring that only the child's hands were visible in the recordings. The rationale for this was similar to the above: the task involved the use of different toys and the simultaneous narration of the stories. For this reasons, the responses were also manually transcribed to an Excel sheet offline by the experimenter and the research assistant that assisted with the data collection. Inter-coder reliability for two coders was assessed for a random sample of 15% of the data. The two coders achieved a 99% agreement, with a Cohen's Kappa of .950.

The version of AOT that was created and used in this study was a measure for one condition namely, the comprehension of the Non-active Voice in Greek. The outcome

variable was target re-enactments which implied comprehension of the items. This variable was coded as follows.

The comprehension condition. All correct re-enactments of the target items (i.e. when the child correctly acted-out the story that the experimenter told her using the available toys) were coded as correct and given a value of '1'. All incorrect responses (i.e. re-enactments that did not correspond to the story that was narrated) were coded as incorrect and given a value of '0'. If the child did not perform any re-enactments with the toys then those trials were coded as 'not applicable' and given 'NA' as a value. Finally, re-enactments that did not relate to the narrated story were (i.e. if the child used the toys to act-out something that did not relate to what she just heard) were excluded from the calculations.

4.4 Models and packages used

All analyses were conducted using R (R Core Team, 2018). Generalized Linear Mixed Effects Models (GLMM) were fitted to the data for the analyses of the TVJT and the AOT and to calculate the main effects using the *glm* function in R and linear mixed-effects models were fitted using the lmer function in the lme4 library of R (Bates et al., 2015).

Following Jaeger (2008), Hatzidaki et al. (2018) and Baayen (2008), I used linear mixed-effects logit models over the widely used ANOVAs for five main reasons:

1. the dependent variable of the study was binomial (that is, whether participants answered yes/no in reply to the comprehension questions after each trial for the TVJT and whether participants acted-out the actions correctly/incorrectly in the AOT based on the story that was narrated to them). In this respect, the logistic regression allowed us to directly analyse the participants' individual responses for each trial without having to rely on an aggregated mean response per condition as is the case with ANOVAs (see also Dixon 2008)

2. as Jaeger (2008) mentions in his case study, mixed-effects models are better than ANOVAs at coping with missing values, they do not make the frequently unjustified assumption of the homogeneity of variances, and finally, the package used here maximises penalised quasi-likelihood

3. another great advantage of using mixed-effects models is that it allowed us to directly include subject and item variance in the same model, so that it would no longer be necessary to perform separate F1 and F2 analyses (which is the case with ANOVAs). (Hatzidaki et al. 2018, p. 496; Jaeger 2008)

4. logit models provide us with more information about the directionality and size of the effect in comparison to the ANOVA output and specifically,

5. Mixed logit models are an extension of logistic regressions with the difference that they allow for modelling of random subject and item effects. Including these random factors is crucial because they allow us to make generalisations beyond the random sample and items chosen in the current study (Clark, 1973).

Finally, it has been argued in the literature that "computational statistical modeling, more precisely finite mixture of autoregressive generalized linear models (GLMs; Lindsey (1997)), can provide new insights into cognitive variability" (Dauvier et al., 2012, p. 441). GLMs account for the variability in the real world and allow for a more conservative and accurate representation of our data ... GLMs offer a wide range of very flexible tools to investigate psychological processes. They also provide the opportunity to address several theoretical issues within a single analysis, reducing the risk of hidden effects due to data aggregation" (Dauvier et al., 2012, p. 441).

4.5 Results I: The truth-value judgement task

In this section, I will report the results for the comprehension condition of the TVJT. First, I will look at the individual variation within each group. After that, I will turn to the

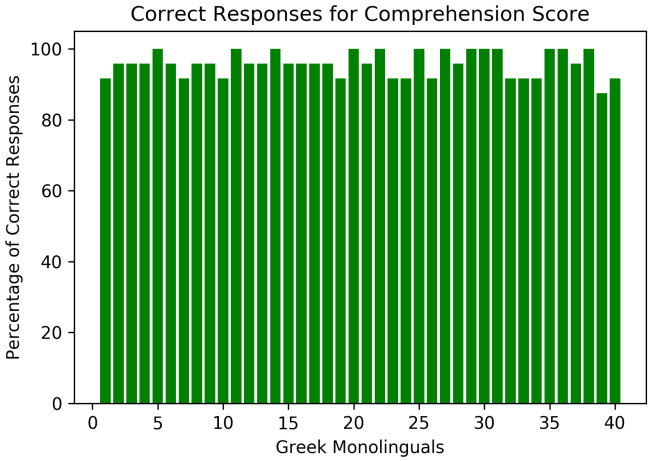
GLMMs that were fitted to the data. For each result, I report the coefficient and its level of significance for each independent variable that was added to the model as a predictor. As in linear regressions, mixed logit models return a coefficient value for each contrast in the model. Coefficients in mixed logit models are given in log-odds (the space in which mixed logit models are fitted to the data). Significant positive coefficients show that a correct answer is more likely in the tested level of the variable than in the other (Jaeger, 2008).

4.5.1 Comprehension scores

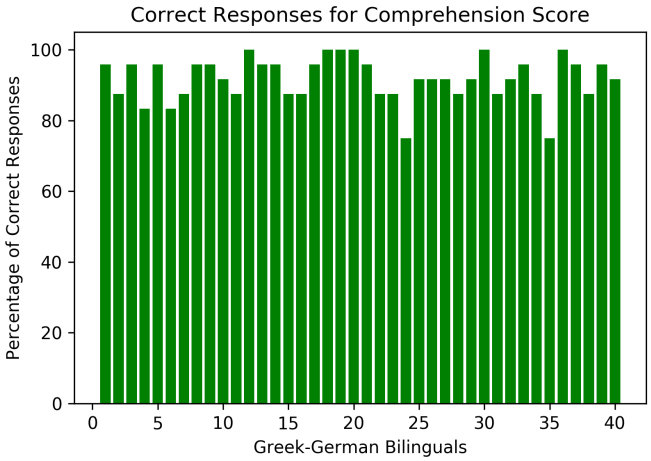
We began by analysing the accuracy of participants' responses in the comprehension condition. To investigate individual variation within each group for this condition, we plotted the proportion of accurate comprehension scores for each child (%) across all experimental conditions, as shown in Figure 4.1.

The plots show that Greek monolingual children performed at ceiling with little variability. They also show that bilingual children are performing above chance but their accuracy is more variable. Overall, Greek monolingual children were 95.8% (*SD* = 0.895, range = 20-24) accurate in the filler sentences, Greek-English bilingual children 93.5% (*SD* = 1.613, range = 17-24), and Greek-German bilingual children 91.7% (*SD* = 1.542, range = 18-24). This meant that they performed above chance and were successful in completing the TVJT. Our control group of Greek adults performed at ceiling in all of the conditions. They were 99.1% accurate in all of the conditions (*SD* = 0.400, range = 23-24).

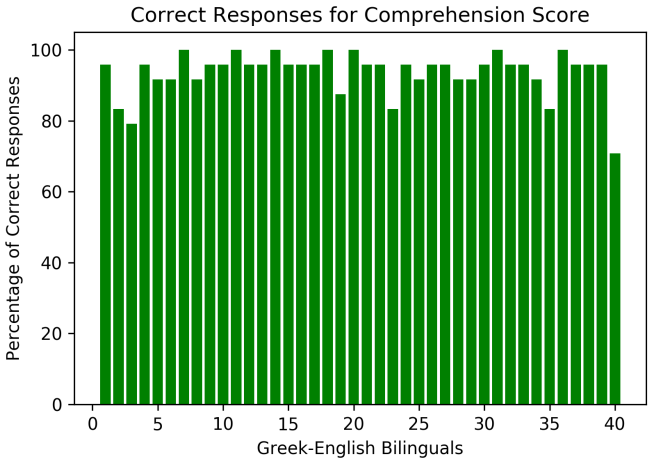
Next, I turn to the GLMM model that was built for this outcome variable. The random effects structure of all models included random intercepts. The fixed effects were: (i) *Group* (Greek-English bilinguals vs Greek-German bilinguals vs Greek monolinguals), (ii) *Interpretation* (3 levels: inherently reflexive vs. reflexive vs. passive), and (iii) *Vocabulary score*. The random effects were: (i) *Test items* and (ii) *Participants*. *Age* was not included as a fixed effect because an analysis of variance (ANOVA) indicated no significant differences in age among the groups, $F(2, 2877) = 1.75$, $p = 0.17$. All variables were zero-centred to



(a) Total correct responses for comprehension in Greek monolingual children



(b) Total correct responses for comprehension in Greek-German bilingual children



(c) Total correct responses for comprehension in Greek-English bilingual children

Fig. 4.1 Percentage of correct responses for comprehension across children populations

allow meaningful interpretation of effects. Random effects for participants and items were included in all models to control for by-participant and by-item variation within one model. This was run for all of the children groups.

The analysis revealed a significant effect of *Vocabulary* reflecting that vocabulary size was a strong predictor of *Comprehension score* (β = 0.044, SE = 0.010, z = 4.286, $p <$ .001). That is, children with higher scores in vocabulary tended to perform overall better in the comprehension condition. Indeed, upon inspecting the differences in vocabulary size visually, it becomes clear why vocabulary is such a strong predictor in the model. The average score for each one of the children groups is shown in Fig. 4.2. Monolingual children outperform both bilingual groups which is hardly surprising.

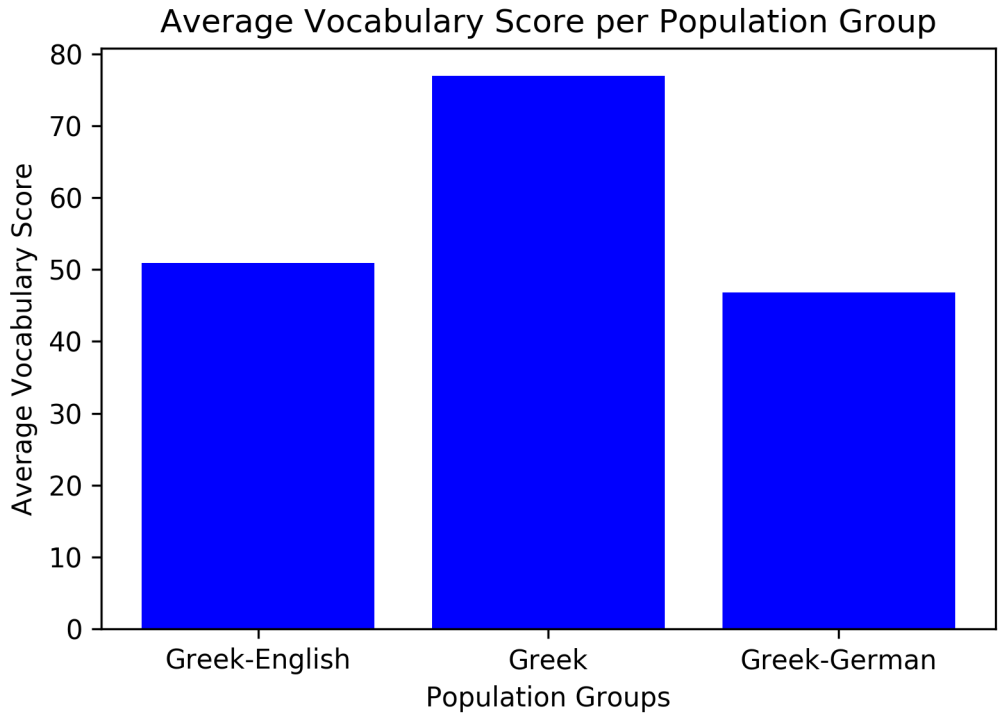


Fig. 4.2 Average Vocabulary Score per Population

Furthermore, the model revealed a significant interaction of *Vocabulary* and *Passives* (β = -2.531, SE = 0.713, z = -3.549, $p <$ .001) which was another significant predictor of children's accuracy in the comprehension condition. Based on this, we could already

draw some preliminary conclusions. In particular, vocabulary size predicts with a high level of confidence the performance children had in comprehension. Similarly for passives, we could conclude that it posed a challenge for all children. Better accuracy responses to passives were predicted by better vocabulary. Bearing this difference in mind, we explored further GLMMs in order to ascertain which one was the best fit for our data. In order to find the model that best fit the data, we further explored the interaction between *Interpretation* and *Vocabulary*. Based on a decrease in the AIC, BIC and logs likelihood this model was considered to be a better fit for the data. The analysis revealed a significant effect for *Vocabulary* ($\beta = 0.092$, SE = 0.026, $z = 3.471$, $p < .001$).

We also explored the interaction of *Group* and *Interpretation* but the AIC, BIC and logs likelihood of the model increased accordingly. Therefore, the model exploring the interaction of *Vocabulary* and *Interpretation* was considered to be the best fit for the data and is presented in Table 4.1. We then performed pairwise comparisons to see if there were any more fine-grained differences in the performance of the groups. Pairwise comparisons for the Greek-English and Greek-German bilingual groups showed that the difference in *Vocabulary* was significant ($\beta = 0.095$, SE = 0.033, $z = 2.831$, $p = .001$) meaning that a larger size vocabulary confidently predicted their accuracy scores in the comprehension condition.

Predictor	β	SE	z	p
Best fit model structure: Accuracy ~ Interpretation * Vocabulary + (1 |Target_items)				
+ (1 |Participant_ID) (n = 2880)				
Variance of participants' random effect: 0.283 (SD = 0.532)				
Variance of items' random effect: 1.405 (SD = 1.185)				
(Intercept)	1.551	0.803	1.931	.053
Group = UK	0.337	0.237	1.422	.155
Group = GR	0.265	0.319	0.832	.405
Vocabulary	0.092	0.026	3.471	<.001***
Active	0.262	0.0910	0.288	.773
Passive	-0.150	0.914	-0.164	.870
Reflexive	-0.014	1.115	-0.013	.990
Vocabulary : Active	-0.001	0.030	-0.045	.964
Vocabulary : Passive	-0.101	0.028	-0.045	<.001***
Vocabulary : Reflexive	-0.003	0.035	-0.96	.924

Table 4.1 Logit mixed model analyses of accuracy scores in comprehension
Interaction of Vocabulary and Interpretation

Furthermore, the interaction of *Vocabulary* and *Passives* was also significant reflecting that the better bilingual children performed in passives, the better the size of their vocabulary (β = -0.111, SE = 0.036, z = -3.063, p = .001). There were no other differences in the bilingual groups. The results are reported in Table 4.2.

Predictor	β	SE	z	p
Best fit model structure: Accuracy ~ Interpretation * Vocabulary + (1 |Target_items)				
+ (1 |Participant_ID) (n = 1920)				
Variance of participants' random effect: 0.336 (SD = 0.580)				
Variance of items' random effect: 1.309 (SD = 1.144)				
(Intercept)	1.434	0.850	1.687	.092
Group = UK	0.372	0.248	1.502	.133
Vocabulary	0.096	0.034	2.831	.001**
Active	0.216	0.957	0.225	.822
Passive	0.207	0.981	0.211	.833
Reflexive	-0.651	1.201	-0.542	.588
Vocabulary : Active	0.002	0.038	-0.054	.957
Vocabulary : Passive	-0.111	0.036	-3.063	.001**
Vocabulary : Reflexive	-0.049	0.053	0.913	.361

Table 4.2 Logit mixed model analyses of accuracy scores in comprehension
Comparison of Greek-English and Greek-German bilinguals

Pairwise comparisons for the Greek monolinguals and the Greek-German bilinguals showed that the difference in *Vocabulary* was significant (β = 0.105, SE = 0.037, z = 2.790, p = .001). That is, it predicted their accuracy scores here, too. Finally, vocabulary predicted accuracy in *Passives*; the effect was significant (β = -0.124, SE = 0.039, z = -3.143, p = .001) reflecting that children's performance in the passive condition was strongly affected by their overall accuracy score. This model is presented in Table 4.3.

Predictor	β	SE	z	p
Best fit model structure: Accuracy ~ Interpretation * Vocabulary + (1 |Target_items)				
+ (1 |Participant_ID) (n = 1920)				
Variance of participants' random effect: 0.092 (SD = 0.3028)				
Variance of items' random effect: 1.592 (SD = 1.262)				
(Intercept)	1.272	1.004	1.267	.205
Group = GR	0.175	0.336	0.521	.602
Vocabulary	0.106	0.038	2.790	.001**
Active	0.098	1.135	0.087	.931
Passive	0.660	1.159	0.569	.569
Reflexive	0.762	1.391	0.548	.584
Vocabulary : Active	-0.005	0.041	-0.128	.898
Vocabulary : Passive	-0.124	0.039	-3.143	.001**
Vocabulary : Reflexive	-0.037	0.046	-0.815	.415

Table 4.3 Logit mixed model analyses of accuracy scores in comprehension
Comparison of Greek monolinguals and Greek-German bilinguals

Finally, pairwise comparisons for the Greek-English bilinguals and Greek monolinguals showed that the difference in *Vocabulary* was significant (β = 0.083, SE = 0.030, z = 2.739, p = .001) meaning that, in this comparison too, vocabulary was a strong predictor of their accuracy scores. This model is shown in Table 4.4.

It is worth noting that when checking for the interaction between *Group* and *Interpretation*, the *Passive* condition was significant, reflecting that the accuracy score was significantly affected, i.e. declined, by their performance in passives (β = -1.760, SE = 0.804, z = -2.188, $p < .001$). No other comparisons were significant. So even without vocabulary as a predictor, passives are still the ones that negatively impact children's performance in the comprehension condition. All in all, what becomes clear from these pairwise comparisons is that there are no other significant differences among the three

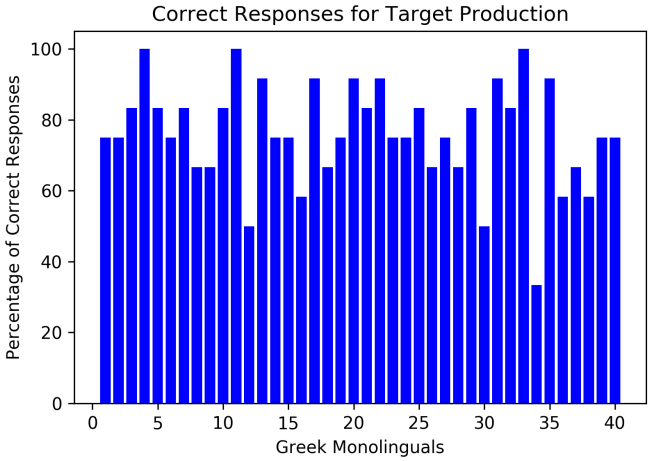
groups and *Vocabulary* seems to predict their accuracy scores for the comprehension condition, especially in passives.

Predictor	β	SE	z	p
Best fit model structure: Accuracy ~ Interpretation * Vocabulary + (1 |Target_items) + (1 |Participant_ID) (n = 1920)				
Variance of participants' random effect: 0.496 (SD = 0.705)				
Variance of items' random effect: 0.781 (SD = 0.884)				
(Intercept)	1.798	0.970	1.853	.064
Group = UK	0.029	0.378	0.076	.940
Vocabulary	0.083	0.030	2.739	.001**
Active	0.846	0.977	0.866	.387
Passive	-0.475	0.976	-0.487	.626
Reflexive	-0.103	1.123	-0.092	.927
Vocabulary : Active	-0.007	0.034	-0.216	.829
Vocabulary : Passive	-0.076	0.031	-2.429	.01*
Vocabulary : Reflexive	-0.001	0.038	0.016	.987

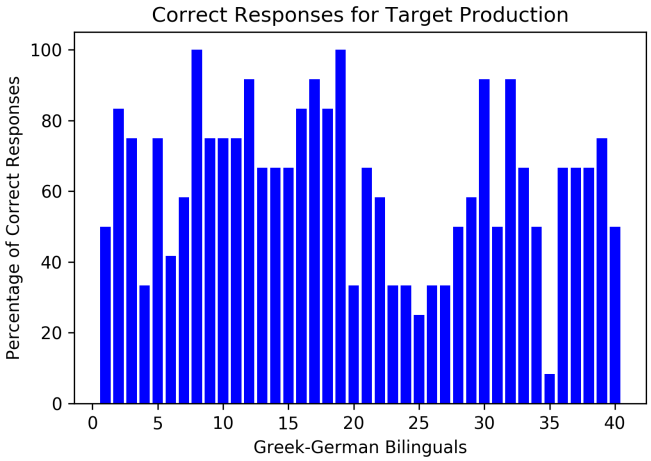
Table 4.4 Logit mixed model analyses of accuracy scores in comprehension
Comparison of Greek monolinguals and Greek-English bilinguals

4.5.2 Target production scores

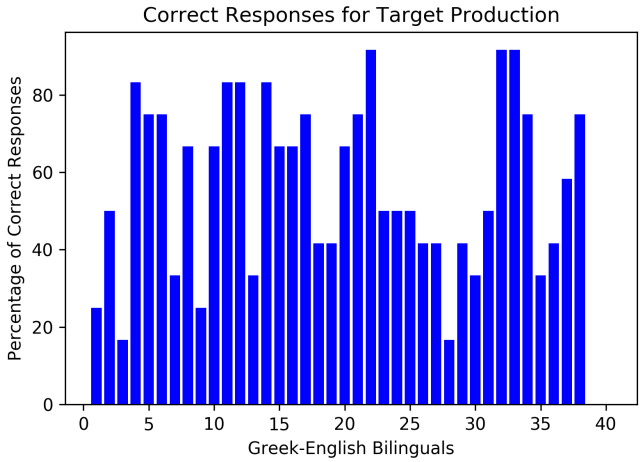
Turning to the target production condition, we began by analysing the accuracy of participants' responses. Target production was applicable for those trials where the comprehension question was manipulated such that it was false. To investigate individual variation within each group for this condition, we plotted the proportion of accurate comprehension scores for each child (%) across all experimental conditions, as shown in Figure 4.3.



(a) Total correct responses for target production in Greek monolingual children



(b) Total correct responses for target production in Greek-German bilingual children



(c) Total correct responses for target production in Greek-English bilingual children

Fig. 4.3 Percentage of correct responses for target production across children populations

Upon first inspection, the plots show that Greek monolingual children performed more 'uniformly' than bilingual children but exhibited some variability in specific items. Bilingual children show a lot more variation in their responses. To explore these differences further, we turn to the GLMM model fitted to this data. The random effects structure of all models included random intercepts. The fixed effects were: (i) *Group* (Greek-English bilinguals vs. Greek-German bilinguals vs. Greek monolinguals), (ii) *Interpretation* (3 levels: active vs. reflexive vs. passive), and (iii) *Vocabulary*. The random effects were: (i) *Test items* and (ii) *Participants*. All variables were zero-centred to allow meaningful interpretation of effects. Random effects for participants and items were included in all models to control for by-participant and by-item variation within one model. This was run for all of the children groups.

The analysis revealed a significant effect of *Group* for the Greek-English bilinguals (β = -0.621, SE = 0.229, z = -2.713, p = .001) reflecting their poor performance in target production. Additionally, a significant effect of *Vocabulary* (β = 0.067, SE = 0.009, z = 6.801, $p < .001$) was revealed indicating that vocabulary was a strong predictor of overall performance in this condition, too. We then further explored the interaction of *Vocabulary* and *Group*, and *Vocabulary* remained a significant predictor of performance (β = 0.068, SE = 0.015, z = 4.279, $p < .001$). In trying to find the model that best fit out data, we further explored the interaction of *Group* and *Interpretation* and this revealed a significant effect of *Group* for Greek monolinguals (β = 1.085, SE = 0.467, z = 2.323, p = .01) meaning that being a member of this group significantly predicted overall performance. In other words, monolinguals performed significantly better in target production. Also, a significant effect of the Greek monolingual group was found for *Passive* (β = -1.606, SE = 0.540, z = -2.970, p = .001) meaning that monolinguals performed significantly better in passives than the rest. The model that best fit the data based on AIC, BIC, and log likelihood was the last one. Namely, target production was best predicted by the interaction of *Group* and *Interpretation*. All in all, being in the Greek population has a significantly positive effect on the performance in passives for target production. The model is presented in Table 4.5.

Predictor	β	SE	z	p
Best fit model structure: Target production ~ Interpretation * Group + (1 |Target_items) + (1 |Participant_ID) (n = 1440)				
Variance of participants' random effect: 1.040 (SD = 1.020)				
Variance of items' random effect: 1.019 (SD = 1.010)				
(Intercept)	0.796	0.778	1.024	.306
Group = GR	1.085	0.467	2.323	.01*
Group = UK	-0.412	0.433	-0.953	.341
Active	-0.174	0.880	-0.197	.843
Passive	-0.150	1.074	-0.140	.889
Reflexive	0.251	1.078	0.233	.816
GR : Active	0.480	0.475	1.011	.312
UK : Active	0.280	0.429	0.654	.513
GR : Passive	-1.606	0.541	-2.970	.001**
UK : Passive	-0.248	0.514	-0.483	.629
GR : Reflexive	-0.723	0.565	-1.280	.201
UK : Reflexive	-0.924	0.528	-1.750	.080

Table 4.5 Logit mixed model analyses of accuracy scores in target production Interaction of Group and Interpretation

We then performed pairwise comparisons to check if there were any more fine-grained differences in the performance of the groups. Pairwise comparisons for the Greek-English and Greek-German bilingual groups showed no significant differences (β = 0.831, SE = 0.867, z = 0.959, p = .337). This reflects the fact that the two groups of bilingual children did not differ significantly from one another in how they performed in target production. The results are reported in Table 4.6.

Predictor	β	SE	z	p
Best fit model structure: Target production ~ Interpretation * Group + (1 |Target_items) + (1 |Participant_ID) (n = 960)				
Variance of participants' random effect: 1.513 (*SD* = 1.230)				
Variance of items' random effect: 1.285 (*SD* = 1.133)				
(Intercept)	0.832	0.868	0.959	.338
Group = UK	-0.438	0.466	-0.939	.348
Active	-0.189	0.978	-0.193	.847
Passive	-0.1446	1.194	-0.121	.904
Reflexive	0.305	1.199	0.254	.799
UK : Active	0.291	0.4391	0.663	.508
UK : Passive	-0.272	0.526	-0.517	.605
UK : Reflexive	-1.014	0.544	-1.863	.063

Table 4.6 Logit mixed model analyses of accuracy scores in target production Comparison of Greek-English and Greek-German bilinguals

Similarly, we performed pairwise comparisons for the Greek monolinguals and Greek-German bilinguals which showed a significant difference in *Group* for Greek monolinguals (β = 1.068, SE = 0.446, z = 2.293, p = .01). In addition to this, there was a significant effect of passives for Greek children (β = -1.571, SE = 0.534, z = -2.940, p = .001). These differences point in the direction of a different trajectory for the monolingual group: their score in target production is confidently predicted by whether they belong to this group and is significantly better than the score Greek-German bilinguals achieved in target production. The model is presented in Table 4.7.

Predictor	β	SE	z	p
Best fit model structure: Target production ~ Interpretation * Group + (1 |Target_items) + (1 |Participant_ID) (n = 960)				
Variance of participants' random effect: 0.739 (SD = 0.860)				
Variance of items' random effect: 0.884 (SD = 0.940)				
(Intercept)	0.768	0.727	1.056	.291
Group = GR	1.068	0.447	2.392	.01*
Active	-0.172	0.826	-0.209	.835
Passive	-0.148	1.007	-0.147	.883
Reflexive	0.267	1.013	0.264	.792
GR : Active	0.408	0.468	0.871	.384
GR : Passive	-1.571	0.534	-2.940	.001**
GR : Reflexive	-0.707	0.560	-1.262	.207

Table 4.7 Logit mixed model analyses of accuracy scores in target production Comparison of Greek monolinguals and Greek-German bilinguals

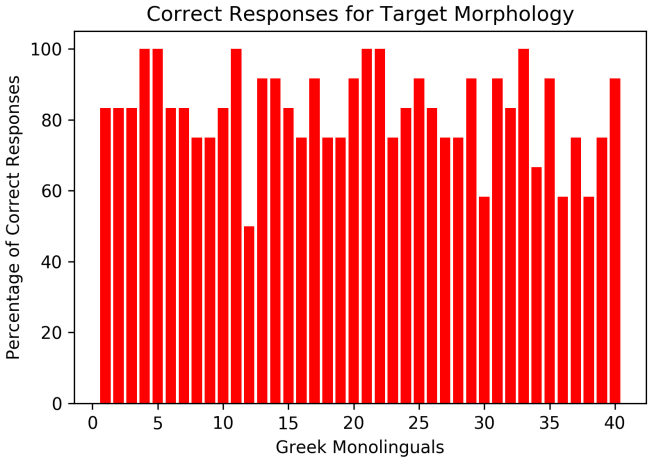
Finally, we compared Greek monolinguals to Greek-English bilinguals. The pairwise comparisons showed a significant effect for *Group* for Greek-English bilinguals (β = -1.485, SE = 0.460, z = -3.230, p = .001). This is also reflected in Fig. 4.3c, confirming that this group of bilinguals performed significantly worse in target production compared to the Greek monolinguals. Also, it revealed a significant interaction of the Greek-English bilingual group with *Passive* (β = 1.350, SE = 0.534, z = 2.526, p = .01) meaning that they performed significantly worse in passives than their Greek peers. The model is presented in Table 4.8. All in all, vocabulary was not the strongest predictor for this variable. Instead, *Group* and *Interpretation* determined children's performance in target production.

Predictor	β	SE	z	p
Best fit model structure: Target production ~ Interpretation * Group + (1 |Target_items) + (1 |Participant_ID) (n = 960)				
Variance of participants' random effect: 0.952 (SD = 0.976)				
Variance of items' random effect: 0.914 (SD = 0.956)				
(Intercept)	1.866	0.762	2.449	.01*
Group = UK	-1.486	0.460	-3.230	.001**
Active	0.290	0.865	0.355	.738
Passive	-1.744	1.036	-1.684	.092
Reflexive	-0.529	1.044	-0.507	.612
UK : Active	-0.189	0.472	0.400	.689
UK : Passive	1.350	0.535	2.526	.01*
UK : Reflexive	-0.130	0.552	-0.236	.814

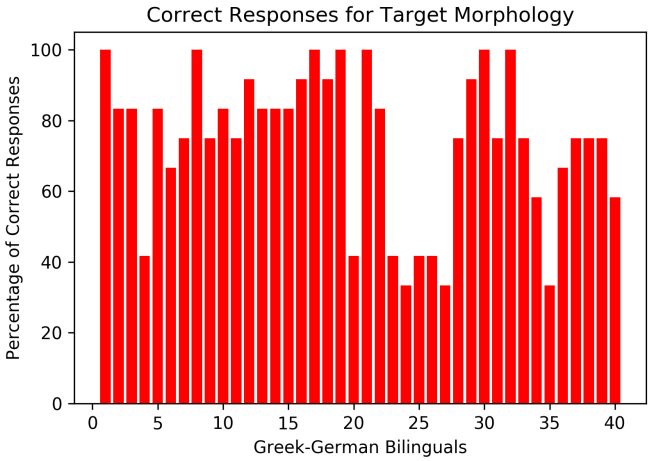
Table 4.8 Logit mixed model analyses of accuracy scores in target production Comparison of Greek monolinguals and Greek-English bilinguals

4.5.3 Target morphology scores

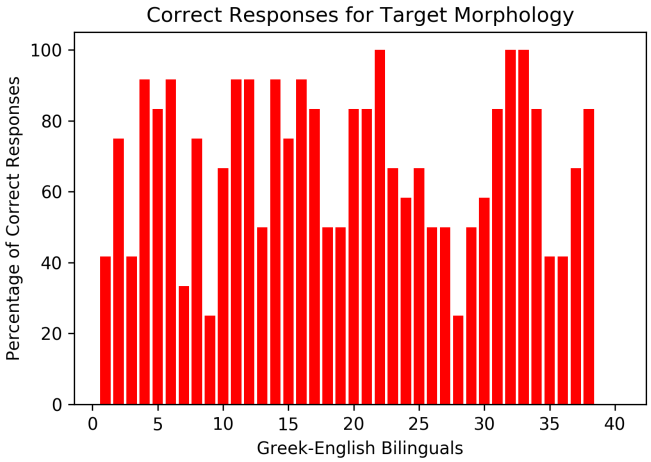
Next, I turn to the target morphology condition. We began by analysing the accuracy of participants' responses. Target morphology is applicable for those trials where the comprehension question was manipulated such that it was false. In this case, the children did not produce the target verb but they did produce the target Nact morphology. To investigate individual variation within each group for this condition, we plotted the proportion of accurate comprehension scores for each child (%) across all experimental conditions, as shown in Figure 4.4.



(a) Total correct responses for target morphology in Greek monolingual children



(b) Total correct responses for target morphology in Greek-German bilingual children



(c) Total correct responses for target morphology in Greek-English bilingual children

Fig. 4.4 Percentage of correct responses for target morphology across children populations

The plots show that all children populations exhibited some variability, the Greek-English bilinguals more than other groups. To explore this further, I turn to the GLMMs that were built for this outcome variable. The random effects structure of all models included random intercepts. The fixed effects were: (i) *Group* (Greek-English bilinguals vs. Greek-German bilinguals vs. Greek monolinguals), (ii) *Interpretation* (3 levels: active vs. reflexive vs. passive), and (iii) *Vocabulary*. Our random effects were: (i) *Test items* and (ii) *Participants*. All variables were zero-centred to allow meaningful interpretation of effects. Random effects for participants and items were included in all models to control for by-participant and by-item variation within one model. This was run for all of the children groups.

The analysis revealed a significant effect of *Group* for the Greek monolinguals (β = -0.992, SE = 0.502, z = -1.975, p = .01), meaning that being in the Greek population has a significant effect on the performance of target morphology: monolinguals perform significantly better. What is more, a significant interaction between the monolingual *Group* and the *Passive* (β = -1.687, SE = 0.559, z = -3.018, p = .001) was revealed indicating that the monolinguals performed significantly better in passives. Added to this, a significant effect of *Vocabulary* (β = 0.084, SE = 0.011, z = 7.313, p < .001) was revealed meaning that vocabulary was a strong predictor of overall performance in target morphology. After exploring the interaction of *Vocabulary* and *Interpretation*, we explored the interaction of *Group* and *Interpretation* and it revealed a significant effect of *Group* for the monolingual children (β = 0.991, SE = 0.502, z = 1.975, p = .01) and a further interaction of the monolingual group with the *Passive* (β = -1.687, SE = 0.559, z = -3.018, p = .001). That is, being monolingual significantly affected the performance in passives for the target morphology condition; it significantly improved their scores. The model that best fit the data based on AIC, BIC, log likelihood was the last one. Namely, target morphology was best predicted by the interaction of *Group* and *Interpretation*. The model is presented in Table 4.9.

Predictor	β	SE	z	p
Best fit model structure: Target morphology ∼ Interpretation * Group + (1 |Target_items) + (1 |Participant_ID) (n = 1440)				
Variance of participants' random effect: 1.486 (SD = 1.219)				
Variance of items' random effect: 0.779 (SD = 0.882)				
(Intercept)	1.032	0.708	1.458	.145
Group = GR	0.992	0.502	1.975	.01*
Group = UK	-0.443	0.469	-0.944	.345
Active	0.825	0.792	-1.042	.298
Passive	-1.191	0.961	-0.199	.842
Reflexive	0.612	0.969	0.632	.528
GR : Active	0.463	0.518	0.894	.371
UK : Active	0.085	0.453	0.188	.851
GR : Passive	-1.688	0.559	-3.018	.001**
UK : Passive	-0.136	0.532	-0.255	.799
GR : Reflexive	-0.670	0.598	-1.121	.262
UK : Reflexive	-1.015	0.548	-1.852	.064

Table 4.9 Logit mixed model analyses of accuracy scores in target morphology Interaction of Group and Interpretation

We then performed pairwise comparisons to see if there were any more fine-grained differences in the performance of the groups. Pairwise comparisons for the Greek-English and Greek-German bilingual groups showed no significant differences (β = 1.106, SE = 0.794, z = 1.392, p = .163). This meant that both bilingual groups exhibited a similar performance in this condition. The results are reported in Table 4.10.

Predictor	β	SE	z	p
Best fit model structure: Target morphology ∼ Interpretation * Group + (1 |Target_items) + (1 |Participant_ID) (n = 960)				
Variance of participants' random effect: 2.103 (*SD* = 1.450)				
Variance of items' random effect: 1.000 (*SD* = 1.000)				
(Intercept)	1.106	0.795	1.392	.164
Group = UK	-0.479	0.508	-0.943	.346
Active	0.880	0.884	0.995	.320
Passive	-0.198	1.073	-1.185	.854
Reflexive	0.654	1.082	0.605	.612
UK : Active	-0.088	0.464	0.189	.850
UK : Passive	-1.160	0.545	-0.294	.769
UK : Reflexive	-0.091	0.562	-1.940	.814

Table 4.10 Logit mixed model analyses of accuracy scores in target morphology Comparison of Greek-German and Greek-English bilinguals

Next, pairwise comparisons for the German-Greek bilinguals and Greek monolinguals showed two significant effects. Firstly, there was a significant effect of Group for the Greek monolinguals meaning that their performance in target morphology was predicted by belonging to that group (β = 0.969, SE = 0.479, z = 2.042, p = .01). Secondly, the interaction between the *Group* of monolinguals and *Passive* was significant (β = -1.641, SE = 0.543, z = -3.024, p = .001) meaning that their performance in target morphology was strongly predicted by the *Passive*. The results are reported in Table 4.11.

Predictor	β	SE	z	p
Best fit model structure: Target morphology ∼ Interpretation * Group + (1 |Target_items)				
+ (1 |Participant_ID) (n = 960)				
Variance of participants' random effect: 0.1.039 (*SD* = 1.019)				
Variance of items' random effect: 0.757 (*SD* = 0.870)				
(Intercept)	1.012	0.689	1.470	.142
Group = GR	0.969	0.475	2.042	.01*
Active	0.785	0.781	1.006	.315
Passive	-0.215	0.945	-0.228	.820
Reflexive	0.631	0.957	0.659	.510
GR : Active	0.483	0.521	0.928	.353
GR : Passive	-1.641	0.543	-3.024	.001**
GR : Reflexive	-0.641	0.597	-1.074	.283

Table 4.11 Logit mixed model analyses of accuracy scores in target morphology Comparison of Greek-German and Greek monolinguals

Similarly, we performed pairwise comparisons for the Greek monolinguals and the Greek-English bilinguals. The analysis revealed the performance in passives for Greek-English children was significant (β = -1.545, SE = 0.501, z = -1518.9, p <.001). These effects point in the direction of significance for passives. That, is passives can significantly predict the bilingual children's performance, The model is presented in Table 4.12.

Predictor	β	SE	z	p
Best fit model structure: Target morphology ~ Interpretation * Group + (1 |Target_items)				
+ (1 |Participant_ID) (n = 960)				
Variance of participants' random effect: 1.364 (SD = 1.168)				
Variance of items' random effect: 0.478 (SD = 0.691)				
(Intercept)	1.025	0.501	1427.9	.146
Group = UK	0.807	0.567	-1403.6	.034
Active	0.605	0.678	1086.9	.323
Passive	-0.218	0.901	-1857.2	.081
Reflexive	-0.131	0.601	128.9	.589
UK : Active	-0.305	0.561	-299.5	.341
UK : Passive	-1.545	0.501	1518.9	<.001***
UK : Reflexive	-0.292	0.701	-287.1	.201

Table 4.12 Logit mixed model analyses of accuracy scores in target morphology
Comparison of Greek monolinguals and Greek-English bilinguals

4.5.4 Error distribution patterns

The TVJT focused on the comprehension of passives and reflexives. During the testing sessions, some systematic errors were observed across populations for specific items. All of the incorrect responses to the comprehension trials as well as those trials that had the additional production layer were transcribed. An initial, exploratory inspection of these incorrect responses uncovered a systematicity in incorrect judgements or productions made by children for specific trials. We decided to explore these further qualitatively and to investigate whether they reveal a systematic pattern that relates to the acquisition of the nonactive Voice in Greek. Two main error patterns were observed:

1. a passive item being erroneously comprehended as *reflexive*

2. verbs with Nact morphology underwent a *stem alternation*

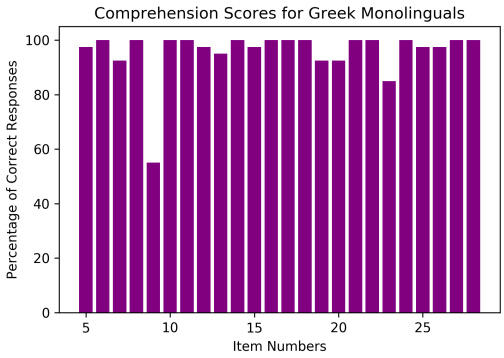
In particular, given the underspecification of the Greek Non-active Voice, children in this task demonstrated a tendency to interpret one of the passive items as reflexive, as seen in Fig. 4.5. In *item 9*, the video clip shows the teddy bear being dried off by the boy. The puppet statement at the end of the video tests the passive:

(25) To arkudaki skupistike
the teddy bear dry.NACT.3SG
'The teddy bear was dried off'

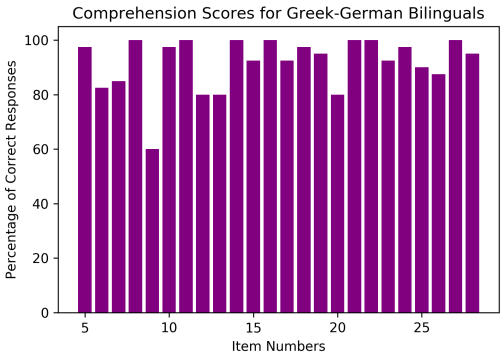
Greek-German bilinguals comprehended the sentence inaccurately (40%) of the time, Greek-English bilinguals (60%) of the time, and Greek monolinguals (55%) of the time. When asked what had happened in the story, they invariably replied:

(26) To agoraki skupistike
the little boy dry.NACT.3SG
'The little boy dried himself'

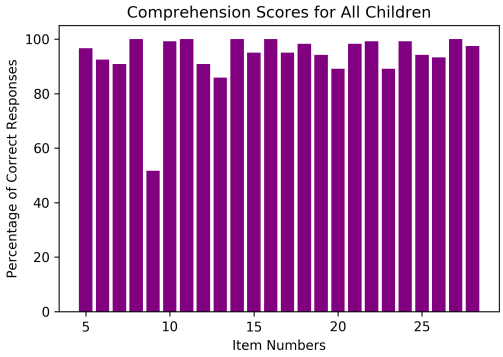
Regarding the second type of error, we found that particularly for the item *gargaliude* (= they are tickling each other), children often produced *gargalizo* which is not a verb in Greek. Moreover, for the item *filithikan* (= they kissed), they often produced *filistikan* which is again not a verb in Greek and, lastly, for the item *plithike*, they often produced *plistike*. An insightful explanation can be found in Alexiadou et al. (2015, pp. 109-110). They have put forward "that morphology is sensitive to the syntactic and not the semantic properties of Voice, i.e. to the properties active vs. non-active and not thematic vs. expletive ... but active Voice may, in principle, trigger a stem alternation in some Germanic causatives in pairs like rise vs. raise, lie vs. lay in English and versinken vs. versenken. Hence, they assume "that in those cases the presence of Voice triggers a stem alternation within the Spell Out of the verbalizer v." In this case it would be that children across populations (UK = 18 tokens, DE = 15 tokens, GR = 9 tokens) make use of the verbaliser *-izo* in Greek.



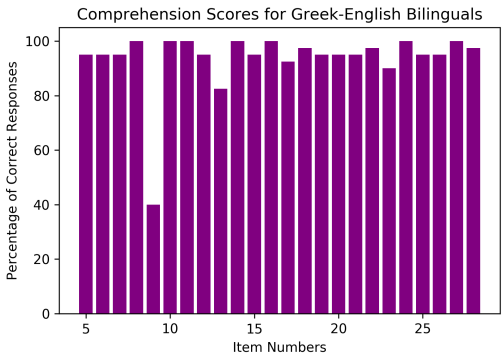
(a) Greek monolinguals



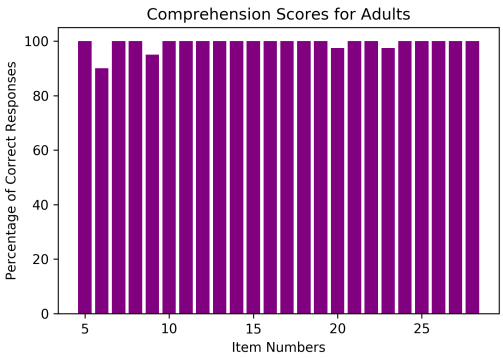
(b) Greek-German bilinguals



(c) All children



(d) Greek-English bilinguals



(e) Adults

Fig. 4.5 Average comprehension scores across groups

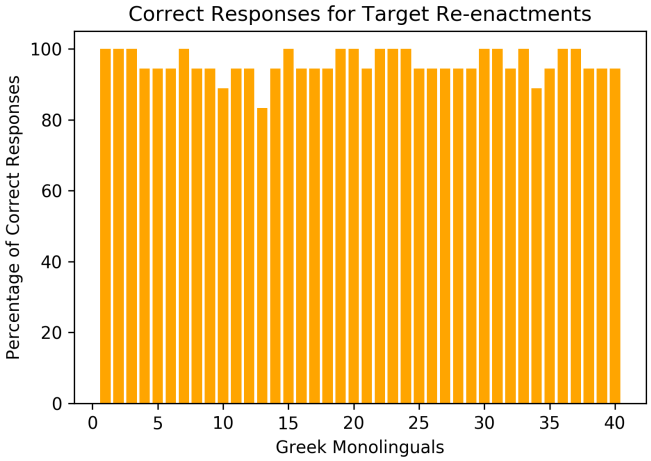
4.6 Results II: The act-out task

Next, I delineate the GLMMs that were built to best fit the data. For each result, I report the coefficient and its level of significance for each independent variable that was added to the model as a predictor. As in linear regressions, mixed logit models return a coefficient

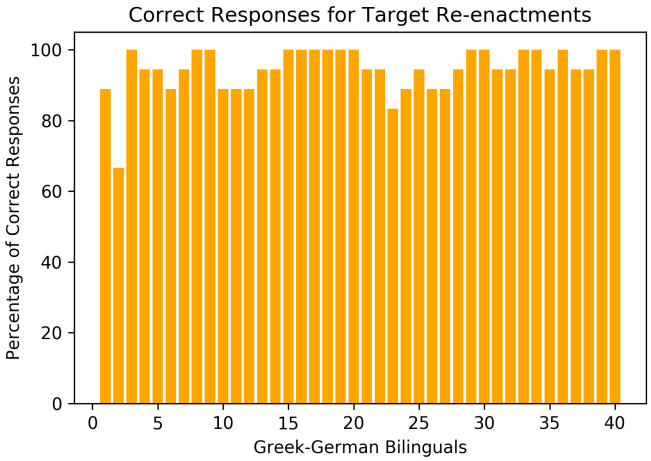
value for each contrast in the model. Coefficients in mixed logit models are given in log-odds (the space in which mixed logit models are fitted to the data). Significant positive coefficients show that a correct answer is more likely in the tested level of the variable than in the other (Jaeger, 2008).

4.6.1 Accuracy scores

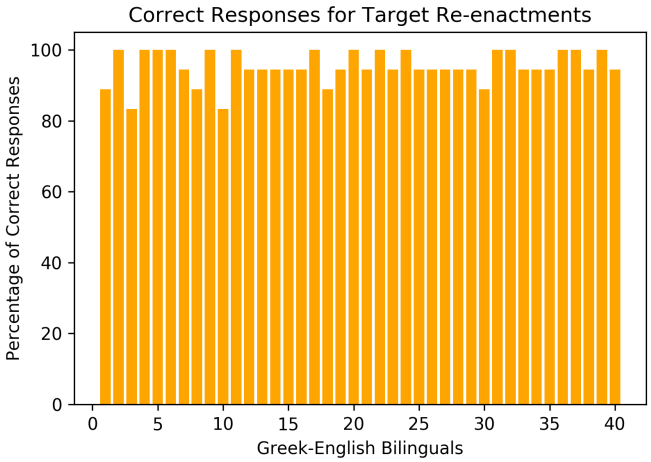
We began by analysing the accuracy of participants' re-enactments. To investigate individual variation within each group for this condition, we plotted the proportion of accurate re-enactments for each child (%) across all experimental conditions, as shown in Figure 4.6. The plots show that Greek monolinguals perform at ceiling, the Greek-English bilinguals demonstrate a similar pattern while the Greek-German bilinguals show more variability in certain items. Next, I turn to the GLMMs that were fitted for all of the variables of interest in the data. The random effects structure of all models included random intercepts. The fixed effects were: (i) *Group* (Greek-English bilinguals vs. Greek-German bilinguals vs. Greek monolinguals) and (ii) *Interpretation* (3 levels: active vs. reflexive vs. passive). Our random effects were: (i) *Test items* and (ii) *Participants*. All variables were zero-centred to allow meaningful interpretation of effects. Random effects for participants and items were included in all models to control for by-participant and by-item variation within one model. This was run for all of the children groups.



(a) Total correct responses for target morphology in Greek monolingual children



(b) Total correct responses for target morphology in Greek-German bilingual children



(c) Total correct responses for target morphology in Greek-English bilingual children

Fig. 4.6 Percentage of correct re-enactments across children populations

After exploring different fits and interactions, this simpler model was found to be the best fit to the data. The analysis revealed a significant effect of *Passive* (β = -4.374, SE = 1.571, z = -2.784, p = .001). This reflected that passives were a strong predictor of the re-enactments for all of the children populations. In fact, passives constituted the condition with which children struggled the most. The model is presented in Table 4.13.

Predictor	β	SE	z	p
Best fit model structure: Target re-enactments ∼ Interpretation + Group + (1 |Target_items) + (1 |Participant_ID) (n = 2160)				
Variance of participants' random effect: 0.879 (*SD* = 0.938)				
Variance of items' random effect: 2.306 (*SD* = 1.518)				
(Intercept)	6.255	1.327	4.715	<.001***
Group = GR	0.460	0.387	1.188	.235
Group = UK	0.255	0.380	0.671	.502
Re-enactment : Active	0.640	1.491	0.429	.668
Re-enactment : Passive	-4.374	1.571	-2.784	.001**
Re-enactment : Reflexive	-2.090	1.605	-1.302	.193

Table 4.13 Logit mixed model analyses of accuracy in target re-enactments

Having found this main effect of *Passive*, we then performed pairwise comparisons to see if there were any more fine-grained differences in the performance of the groups. Pairwise comparisons for the Greek-English and Greek-German bilingual groups showed a significant effect of *Passives* (β = -4.053, SE = 1.498, z = -2.706, p = .001) meaning that both groups showed difficulties with the comprehension of passives. The results are reported in Table 4.14.

Predictor	β	SE	z	p
Best fit model structure: Target re-enactments ~ Interpretation + Group + (1 |Target_items)				
+ (1 |Participant_ID) (n = 1440)				
Variance of participants' random effect: 1.066 (SD = 1.033)				
Variance of items' random effect: 1.998 (SD = 1.414)				
(Intercept)	5.956	1.282	4.647	<.001***
Group = UK	0.235	0.390	0.602	.547
Re-enactment : Active	0.648	1.429	0.454	.650
Re-enactment : Passive	-4.054	1.498	-2.706	.001**
Re-enactment : Reflexive	-1.981	1.528	-1.297	.195

Table 4.14 Logit mixed model analyses of accuracy in target re-enactments
Comparison of Greek-English bilinguals and Greek-German bilinguals

Next, pairwise comparisons for the Greek-English bilinguals and the Greek monolinguals showed no significant effects (β = 23.258, SE = 7156.3, z = 0.003, p = .997). The results are reported in Table 4.15.

Predictor	β	SE	z	p
Best fit model structure: Target re-enactments ~ Interpretation + Group + (1 |Target_items)				
+ (1 |Participant_ID) (n = 1440)				
Variance of participants' random effect: 0.250 (SD = 0.500)				
Variance of items' random effect: 3.771 (SD = 1.942)				
(Intercept)	23.358	7156.337	0.003	.997
Group = UK	-0.210	0.338	-0.620	.535
Re-enactment : Active	-3.492	7192.528	0.000	1.000
Re-enactment : Passive	-21.290	7156.337	-0.003	.998
Re-enactment : Reflexive	-18.399	7156.337	-0.003	.998

Table 4.15 Logit mixed model analyses of accuracy in target re-enactments
Comparison of Greek monolinguals and Greek-English bilinguals

Similarly, we performed pairwise comparisons for the Greek monolinguals and the Greek-German bilingual groups; there was a significant effect of *Passive* (β = -3.871, SE = 1.621, z = -2.387, p = .01) which meant that their performance in target production was predicted by the passive condition. In other words, passives still pose a challenge for children. The results are reported in Table 4.16.

Predictor	β	SE	z	p
Best fit model structure: Target re-enactments ~ Interpretation + Group + (1 |Target_items) + (1 |Participant_ID) (n = 1440)				
Variance of participants' random effect: 1.111 (SD = 1.054)				
Variance of items' random effect: 2.453 (SD = 1.566)				
(Intercept)	6.018	1.373	4.384	<.001***
Group = GR	456	0.408	1.119	.263
Re-enactment : Active	0.651	1.524	0.427	.669
Re-enactment : Passive	-3.872	1.622	-2.387	.01*
Re-enactment : Reflexive	-1.931	1.655	-1.167	.243

Table 4.16 Logit mixed model analyses of accuracy in target re-enactments
Comparison of Greek monolinguals and Greek-German bilinguals

4.6.2 Error distribution patterns

Similarly to the TVJT, during the testing sessions, some systematic errors were observed across populations for specific items. All of the incorrect responses to the act-out trials were transcribed. An initial, exploratory inspection of these incorrect responses uncovered a systematicity in incorrect re-enactments performed by children for specific trials. We decided to explore these further qualitatively and to investigate whether they reveal a systematic pattern that relates to the acquisition of the nonactive Voice in Greek. Two main error patterns were observed in this task:

- Non-target re-enactments of a specific passive item

- Non-target re-enactments of a specific reflexive item

To begin with, the distribution of accuracy per item for all three stories that were included in the act-out task are presented together in Fig. 4.7. Upon inspection, *item 4* stands out as the one with the least accuracy which corresponds to a passive re-enactment from Story 1:

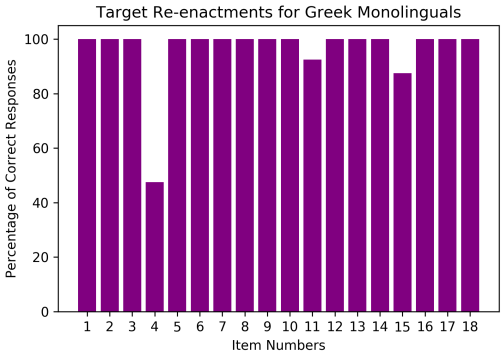
(27) O niptiras skupistike
the washbasin dry.NACT.3SG
'The washbasin was dried off'

Interestingly, all children groups seemed to struggle with this item. In fact, Greek-English bilinguals were accurate 52.5% of the time, Greek-German bilinguals = 52.5 % of the time and Greek monolinguals = 47.5% of the time. One reason for this could have to do with the design of the item itself. The subject DP in the story up until *item 4* is *Giorgakis* and the change to an inanimate DP, without a transition sentence, makes it a very marked choice and potentially creates a reference continuity problem. Perhaps if the subject was introduced with a filler item, children would have more time to compute the change in subject.

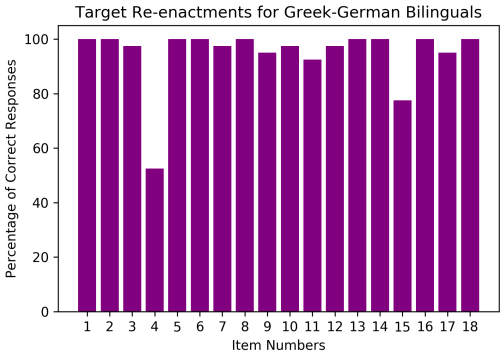
The next item in which children seemed to not perform well was *15* which was included in Story 3 to act as a reflexive verb:

(28) I mama piastike apo tin karekla
the mama 'len'.NACT.3SG
'Mum leaned over the chair'

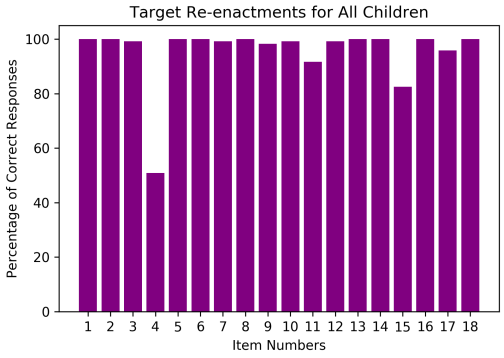
In this item, Greek-English bilinguals were accurate 82.5% of the time, Greek-German bilinguals = 77.5% of the time and Greek monolinguals 87.5% of the time. One reason for this could have to do with the use of the verb in that specific context. Perhaps accuracy would have improved if the experimenter had added more context as to why 'mum' performed that action.



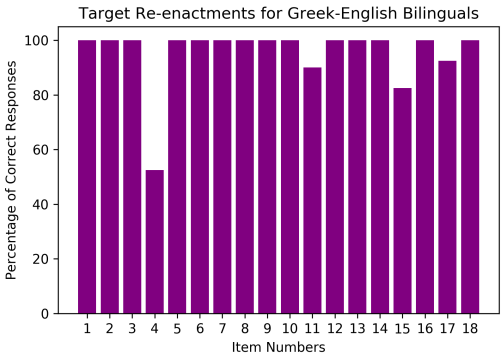
(a) Greek monolinguals



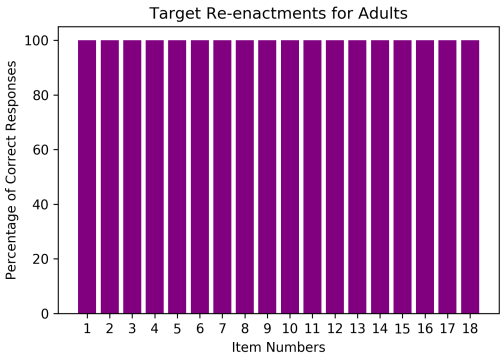
(b) Greek-German bilinguals



(c) All children



(d) Greek-English bilinguals



(e) Adults

Fig. 4.7 Average comprehension scores across groups

4.7 Interim summary

The coding and scoring schemes applied to the raw data to prepare it for the statistical analyses resulted in three outcome variables for the TVJT. Namely, the comprehension, the target production, and the target morphology condition. Similarly for the AOT, it resulted in one main outcome variable; that of correct re-enactments.

GLMMs were preferred for the analysis of our binomial variables.

The main findings of our two experimental tasks. Namely, the TVJT and the AOT revealed main effects of significance for predictors such as *Vocabulary*, *Group*, and *Passives*. A number of GLMMs were explored in order to ascertain the best fit to the data.

The TVJT revealed a significant effect of *Vocabulary* which is the best predictor of children's accuracy on the comprehension condition. *Interpretation*, *Group*, and *Passive* proved to be the most significant predictors of children's performance in target production and target morphology. All of the models along with descriptive graphs of the data were presented.

Two error patterns were discussed for the TVJT: one which involved a passive item and one which involved stem alternations in Greek.

The AOT revealed a significant effect of *Passive*. It was shown that children across populations seem to struggle with the passive interpretation. The model along with descriptive graphs were presented.

Two error patterns were discussed for the AOT: one which involve a passive item and one which involved a reflexive item.

In the next chapter, I discuss the main findings in more detail. I also address the strengths and limitations of this study and also propose possible future directions.

Chapter 5

Discussion

5.1 General conclusions

The present study investigated whether bilingual Greek-English and Greek-German children between the ages of four and eight understand and produce passives and reflexives in Greek given the Greek Nact syncretism and compared them to monolingual Greek children.

The study offers four major findings:

1. Children across populations performed worst in the passive conditions
2. Passive sentences were often erroneously interpreted as reflexive
3. Bilingual children showed no delay in comparison to their monolingual peers
4. Vocabulary is the strongest predictor of children's performance on the Greek Nact

This dissertation shows that across populations, children are most challenged by passives. Interestingly, there is no difference between bilingual and monolingual groups in comprehension scores for either of the tasks. Pairwise comparisons for investigating fine-grained differences among the three groups consistently indicate that vocabulary is the strongest predictor of performance in that condition along with passives. The monolinguals show a

small advantage for target production and target morphology but this is to be expected as they live in a Greek environment.

With respect to passives, this dissertation shows that bilingual children coming from two different linguistic backgrounds (in terms of the morphosyntax of Voice) perform poorly in items that test the passive. Further to this, they do not show an advantage in 'disambiguating' the Greek Non-active morphology because of their 'other' language. Indeed, bilingual children seems to be on par with their monolingual peers. Specifically, all bilingual children showed a tendency to interpret passives as reflexives (even when the subject of the sentence was inanimate). This supports accounts that speak of a maturational account and claim that these structures will eventually become available to the child. At the same time, we found that vocabulary predicts accuracy which gives support to frequency-based accounts that support the significance of input. In that sense, one could expect that more systematic exposure to Greek may lead to better performance in Nact, as it is shown in production variables in the case of the monolingual children. In other words, input matters. Indeed, Greek children achieved an accuracy score of 76.9% in the vocabulary task while Greek-German bilinguals achieved an accuracy score of 46.8% and Greek-English bilinguals achieved an accuracy score of 50.9%. These differences are clearly reflected in their production skills.

Another way of looking at the findings specifically for passives is that being bilingual does not seem to delay the children any more than it does monolinguals. Contrary to one of the predictions, bilingual children do not seem to have an advantage due to the fact that their other language lacks a syncretism comparable to that of the Greek Nact. We had predicted that the saliency of a structure may aid its acquisition in another language. Rather, it seems to be the case that certain interpretations like the reflexive in German are acquired early and seem to be generally easier since they do not involve re-assignment of theta-roles but they do not aid children in disambiguating Nact morphology. It is still important to note that bilingual children are not performing significantly worse than their Greek peers. That is, despite acquiring two languages with two different morphosyntactic

ways of expressing Voice, children do not seem to be delayed just as they do not seem to have an advantage compared to their monolingual peers.

Furthermore, we did not find that children performed significantly better in any of the other verb types included in the study. The overarching result was that passives seem to be challenging for children in our age-range. Monolingual children performed slightly better than the bilinguals but they did not exhibit adult-like mastery. Both bilingual groups made a similar number of morphosyntactic errors whereby they attribute active Voice to Nact verbs.

With respect to research question 3.2.1, we were able to replicate the results of many previous studies in L1 acquisition of passives. Namely, we found that Greek Nact passives are hard to comprehend for all children regardless of whether they are bilingual or not. Almost all of our conditions revealed a main effect for passives due to the poor performance children exhibited in those items. We predicted that bilinguals would struggle with the syncretism but we did not have a directional hypothesis as to what pattern this would manifest in. Bilingual children do not seem to be more sensitive to Nact earlier than their monolingual peers. Rather as far as comprehension in both tasks is concerned, vocabulary seems to play a central role in their performance in Nact for the TVJT whereas AOT indicates a main effect of passives, reflecting that passives were the hardest structure to re-enact. However, as it was pointed out, the low scores in some of the passive items, in AOT in particular, could be explained due to a methodological flaw in the story for which the low scores were obtained. In terms of production, bilingual children seem to perform worse in both target production and target morphology which further confirms that they are not sensitive to Nact ahead of their peers. With respect to research question 3.2.2, children across populations have a tendency to attribute a reflexive interpretation to the Nact syncretism. Our results showed that children's performance was greatly predicted by the size of their vocabulary. Once we added vocabulary as a predictor in the model, we found an interaction with passives. This indicated that the bigger the vocabulary size, the better the performance in passives.

With regard to research question 3.2.3, we could not detect a bilingual advantage in the acquisition of Voice or particular instances of crosslinguistic influence. However, bilinguals were definitely worse performers in the production conditions. The fact that the bilingual children were acquiring another language that does not share the Greek syncretism, did not appear to give them a boost. Finally, with respect to research question 3.2.4, exploring how children performed in the comprehension condition of the TVJT, it was shown that accuracy in the passive trials was, across the board, the one condition in which all three populations perform very poorly. This is consistent with previous reports of non-mastery before the age of eight in some cases.

5.2 Strengths of the present study

This is, to my knowledge, the first study to focus on the acquisition of transitivity alternations by looking at these two specific bilingual groups and linguistic combinations. A number of studies have focused on a wide range of languages for L1 acquisition but very few have actually looked at the development of transitivity alternations in bilinguals. Apart from the pilot studies Zombolou and Alexiadou (2012a) conducted in Germany with Greek-German bilinguals investigating the same phenomenon, there is a dearth of studies, both on the acquisition of Voice crosslinguistically or any aspect of language acquisition, by bilingual children with a Greek background.

This dissertation shows that vocabulary in bilingual children with Greek as one of their languages, predicts sensitivity to Voice. In other words, more exposure to Greek can lead to a better understanding of the syncretism. More importantly, the L2 does not affect how bilingual children process the Greek Nact. Nact was found to be hard to understand even by the older children in the study. It also shows that bilingual children face the same challenge as monolingual children in terms of comprehending passives. As it has been noted, homogeneity within bilingual populations can be very challenging and most studies have a modest sample size; the sample of this study is quite large and quite representative

of its populations. Finally, the studies that have investigated bilingual speakers have mostly focused on the phonological aspects of their grammar while this study focused on grammatical morphosyntactic structures in an attempt to pinpoint how the bilingual grammar develops. In order to look at the acquisition of language at large, and specific structures at the micro-level, we should investigate the acquisition of these structures in children with different linguistic backgrounds. This study has addressed this gap by investigating these three populations in conjunction. The findings of this dissertation do not only contribute to the gap in the literature but also to the bilingual communities.

5.3 Limitations of the present study

As it was pointed out (see Sections 3.5 for the TVJT and 3.6 for the AOT rationale), like all experimental tasks, these too have certain disadvantages. For one thing, the TVJT can be time-consuming, resulting in lack of concentration or simply lack of interest on the part of the child. Its length also imposes logistical limitations because time is normally restricted, especially when working with children populations and having to visit them at their schools or at their homes. For this reason, we were only able to include 12 test trials in the TVJT which, in turn, meant that each verb type was tested through four trials. In order to offset that, and as it is recommended in Crain and Thornton (1998, p. 213), data from more children could have increased the power of our statistical computations and may have disentangled certain interactions. As for the materials themselves, as it was pointed out in the discussion that two of the AOT items could have been honed more in order to be less marked.

Furthermore, it would have been useful to collect information regarding the children's schooling; contextualising their abilities in relation to what type of school they were attending (if they were receiving any support classes and, if yes, how frequently), would have aided in disentangling why they performed worse in the baseline task. One could argue that their poor performance is not a question of Voice acquisition but of bilingualism.

Thus, employing questionnaires that are more sensitive to language dominance could have helped us build an even more accurate picture of their environment and the overall consistent exposure they have to Greek in their daily lives.

In this study, I matched the different populations based on their chronological age. A different matching strategy, for instance, based on the size of their vocabulary might have divulged a different performance in Nact verbs. Bilinguals were expected to have a more limited vocabulary since they live in a country other than Greece and are constantly exposed to either a German or an English environment. On the other hand, monolinguals are accordingly expected to have a much richer vocabulary. Another idea might have been to match them on receptive vocabulary in addition to the expressive vocabulary we used. This would have given us a better idea of their knowledge of Greek. Having said that, it is, logistically speaking, a challenge to find balanced bilinguals and control for a number of different variables in a short span of time. Another way of improving this study would have been by developing more material for stimuli in order to get a clearer picture of the differences among the groups and, additionally, more power for statistical purposes.

5.4 Future directions

> Psycholinguistic research can also inform educational research interested in the effects of language interaction and performance differences between native speakers, children and adults, with the potential to apply its findings to instruction programmes for L2 learners (Hatzidaki et al., 2018, p. 491)

This quote contextualises psycholinguistic research within a broader context, one that pertains more so to the populations that are being tested. Psycholinguistic studies are not only conducted to benefit and inform theoretical accounts of language acquisition but can also have pedagogical relevance.

Bilingual children are known to lag behind their peers in certain stages of their linguistic development. In fact, bilingualism is sometimes seen as a language impairment. It would

be of significance and great interest not only for linguistic purposes but also for the society at large to perhaps compare bilingual children with Greek as one of their languages to Greek children with Developmental Language Disorder (matched in vocabulary). Do their Voice systems develop similarly? Can we pinpoint if there are any differences in the way they acquire morphosyntactic structures like the Nact?

The next step in this study specifically would be to recruit two more monolingual groups, one with L1 German and one with L1 English so that we can have a baseline as to how they perform in the same tasks and then test the bilingual children in both of their languages. Additionally, a longitudinal study could shed light on the developmental path children follow from birth. Another interesting idea would be to look into avoidance strategies for those bilinguals who do not produce Nact accurately. Moreover, seeing as children within the age range of this study (4-8) still face difficulties with passives, perhaps increasing the age range would give us a more representative sample of bilinguals.

Finally, in this study we only explored the active-passive and reflexive alternations. In future studies, it would be interesting to look at anticausatives as well and to test children in their other (and sometimes dominant) language. That way we would be able to compare if the children who make more mistakes in Greek also make more mistakes in their other language. That, in turn, would allow us to assess their performance in one language and compare it to their performance in their other language.

References

Alexiadou, A. (2010). On the morpho-syntax of (anti-) causative verbs. In Rappaport Hovav, M., Doron, E., and Sichel, I., editors, *Syntax, lexical semantics and event structure*, pages 177–203. Oxford University Press, Oxford.

Alexiadou, A. (2013). Where is Non-Active Morphology? In Müller, S., editor, *Proceedings of the 20th International Conference on Head-Driven Phrase Structure Grammar*, pages 244–262, Stanford, CA. CSLI Publications.

Alexiadou, A. (2014a). Active, middle, and passive: the morpho-syntax of Voice. *Catalan Journal of Linguistics*, 13:19–40.

Alexiadou, A. (2014b). Roots in transitivity alterations: the case of afto/auto-reflexives. In Alexiadou, A., Borer, H., and Schäfer, F., editors, *The syntax of roots and the roots of syntax*, volume 51, pages 57–80. Oxford University Press, Oxford.

Alexiadou, A. and Anagnostopoulou, E. (1998). Parametrizing AGR: Word order, V-movement and EPP-checking. *Natural Language & Linguistic Theory*, 16(3):491–539.

Alexiadou, A. and Anagnostopoulou, E. (2004). Voice morphology in the causative-inchoative alternation: Evidence for a non-unified structural analysis of unaccusatives.

In Alexiadou, A., Anagnostopoulou, E., and Everaert, M., editors, *The unaccusativity puzzle*, pages 114–136. Oxford University Press, Oxford.

Alexiadou, A., Anagnostopoulou, E., and Schäfer, F. (2006). The properties of anti-causatives crosslinguistically. In Frascarelli, M., editor, *Phases of interpretation*, pages 187–211. Mouton de Gruyter, Berlin.

Alexiadou, A., Anagnostopoulou, E., and Schäfer, F. (2015). *External arguments in transitivity alternations: A layering approach*, volume 55. Oxford University Press, Oxford.

Alexiadou, A. and Doron, E. (2012). The syntactic construction of two non-active voices: passive and middle. *Journal of Linguistics*, 48(1):1–34.

Alexiadou, A. and Schäfer, F. (2012). Natural reflexive verbs revisited. In *GLOW Workshop "Empty categories in syntax: are there any?"*, Postdam. University of Postdam.

Amberber, M. (1996). *Transitivity alternations, event-types and light verbs*. PhD thesis, McGill University.

Ambridge, B. and Rowland, C. F. (2013). Experimental methods in studying child language acquisition. *Wiley Interdisciplinary Reviews: Cognitive Science*, 4(2):149–168.

Anagnostopoulou, E. and Everaert, M. (1999). Toward a more complete typology of anaphoric expressions. *Linguistic Inquiry*, 30(1):97–119.

Antoniou, K. and Katsos, N. (2017). The effect of childhood multilingualism and bilectalism on implicature understanding. *Applied psycholinguistics*, 38(4):787–833.

Armon-lotem, S. (2012). Introduction: Bilingual children with SLI the nature of the problem. *Bilingualism: Language and Cognition*, 15(1):1–4.

Armon-lotem, S., Haman, E., López, K. J. D., Yatsushiro, K., Szczerbinski, M., Hout, A. V., Dabašinskienė, I., Gavarró, A., Hobbs, E., Kamandulytė, L., Katsos, N., Kunnari, S., Nitsiou, C., Sundahl, L., Parramon, X., Sauerland, U., Torn-leesik, R., Der, H. V., Yatsushiro, K., Szczerbinski, M., Hout, A. V., Dabašinskienė, I., Gavarró, A., Hobbs, E., Kamandulytė-merfeldienė, L., Katsos, N., Kunnari, S., Nitsiou, C., Olsen, L. S., Parramon, X., Sauerland, U., and Torn-leesik, R. (2016). A large-scale cross-linguistic investigation of the acquisition of passive. *Language Acquisition*, 23(1):27–56.

Baayen, R. H. (2008). *Analyzing Linguistic Data: A Practical Introduction to Statistics using R*. Cambridge University Press, Cambridge.

Babyonyshev, M., Ganger, J., Pesetsky, D., and Wexler, K. (2001). The Maturation of Grammatical Principles: Evidence from Russian Unaccusatives. *Linguistic Inquiry*, 32(1):1–44.

Baker, J. (2016). Split intransitivity in English. *Cambridge Occasional Papers in Linguistics*, 9(1):1–34.

Baker, M., Johnson, K., and Roberts, I. (1989). Passive arguments raised. *Linguistic inquiry*, 20(2):219–251.

Bates, D., Mächler, M., Bolker, B., and Walker, S. (2015). Fitting Linear Mixed-Effects Models Using lme4. *Journal of Statistical Software*, 1(1).

Berman, R. A. (1993). Marking of verb transitivity by Hebrew-speaking children. *Journal of child language*, 20(3):641–669.

Berman, R. A. and Sagi, I. (1981). On Word-formation and word-innovation in early age. *Balshanut Ivrit Xofshit*, 18:31–36.

Berman, R. A. and Slobin, D. I. (1985). The acquisition of Hebrew. In *The cross-linguistic study of language acquisition*, volume 1, pages 255–371. Lawrence Erlbaum, Hillsdale, NJ.

Bever, T. G. (1970). The cognitive basis for linguistic structures. In Hayes, J. R., editor, *Cognition and the development of language*, pages 279–362. Wiley, New York, NY.

Boeckx, C., editor (2012). *The Oxford Handbook of Linguistic Minimalism*. Oxford University Press, Oxford.

Borer, H. (1994). The Projection of Arguments. In Benedicto, E. and Runner, J., editors, *Functional Projections, University of Massachusetts Occasional Papers in Linguistics 17*, pages 19–47. GSLA, Amhurst.

Borer, H. (1998). Deriving passives without theta-grids. In Lapointe, S. G., Brentari, D. K., and Farrell, P. M., editors, *Morphology and its relation to phonology and syntax*, pages 60–69. CSLI Publications, Stanford, CA.

Borer, H. (2004). The grammar machine. In Alexiadou, A., Anagnostopoulou, E., and Everaert, M., editors, *The unaccusativity puzzle: Explorations of the syntax-lexicon interface*, volume 5, pages 288–331. Oxford University Press, Oxford.

Borer, H. and Wexler, K. (1987). The maturation of syntax. In *Parameter setting*, pages 123–172. Springer.

Borer, H. and Wexler, K. (1992). Bi-unique relations and the maturation of grammatical principles. *Natural Language & Linguistic Theory*, 10(2):147–189.

Bresnan, J. (1982). The passive in lexical theory. In Bresnan, J., editor, *The mental representation of grammatical relations*, pages 3–86. MIT Press, Cambridge, MA.

Brooks, P. J. and Tomasello, M. (1999). Young children learn to produce passives with nonce verbs. *Developmental psychology*, 35(1):29–44.

Chien, Y.-C. and Wexler, K. (1990). Children's knowledge of locality conditions in binding as evidence for the modularity of syntax and pragmatics. *Language acquisition*, 1(3):225–295.

Chierchia, G. (2004). A semantics for unaccusatives and its syntactic consequences. In Alexiadou, A., Anagnostopoulou, E., and Everaert, M., editors, *The Unaccusativity Puzzle*, volume 5, pages 22–59. Oxford University Press, Oxford.

Chomsky, N. (1965). *Aspects of the Theory of Syntax*. MIT Press, Cambridge, MA.

Chomsky, N. (1980). Rules and representations. *The Behavioral and Brain Sciences*, 3:1–61.

Chomsky, N. (1981). *Lectures on Government and Binding*. Foris Publications, Dordrecht.

Chomsky, N. (1995). *The Minimalist Program*. MIT Press, Cambridge, MA.

Clark, H. H. (1973). The language-as-fixed-effect fallacy: A critique of language statistics in psychological research. *Journal of Verbal Learning and Verbal Behavior*, 12(4):335–359.

Crain, S. and Thornton, R. (1998). *Investigations in universal grammar: a guide to experiments on the acquisition of syntax and semantics*. MIT Press, Cambridge, MA.

Crawford, J. L. (2012). *Developmental perspectives on the acquisition of the passive*. PhD thesis, University of Connecticut.

Daskalaki, E. and Paradis, J. (2018). Input effects across domains: The case of Greek subjects in child heritage language. *Second Language Research*, pages 1–25.

Dauvier, B., Chevalier, N., and Blaye, A. (2012). Using finite mixture of GLMs to explore variability in children's flexibility in a task-switching paradigm. *Cognitive Development*, 27(4):440–454.

De Villiers, J. G. (1985). Learning how to use verbs: Lexical coding and the influence of the input. *Journal of Child Language*, 12(3):587–595.

Demuth, K. (1989). Maturation and the Acquisition of the Sesotho Passive. *Linguistic Society of America*, 65(1):56–80.

Demuth, K., Moloi, F., and Machobane, M. (2010). 3-Year-olds' comprehension, production, and generalization of Sesotho passives. *Cognition*, 115(2):238–251.

Dixon, P. (2008). Models of accuracy in repeated-measures designs. *Journal of Memory and Language*, 59(4):447–456.

Dixon, R. M. W. (1979). Ergativity. *Language*, 55(1):59–138.

Doron, E. and Hovav, M. R. (2007). Towards a uniform theory of valence-changing operations. *Proceedings of IATL*, 23:57–88.

Embick, D. (1997). *Voice and the interfaces of syntax.* PhD thesis, University of Pennsylvania.

Embick, D. (1998). Voice Systems and the Syntax/Morphology Interface. In *The Proceedings of the Penn/MIT Workshop on Aspect, Argument Structure, and Events*, number May, pages 1–32. University of Pennsylvania.

Embick, D. (2004). Unaccusative syntax and verbal alterations. In Alexiadou, A., Anagnostopoulou, E., and Everaert, M., editors, *The unaccusativity puzzle: Explorations of the syntax-lexicon interface*, volume 5, pages 137–158. Oxford University Press, Oxford.

Fagan, S. M. B. (1992). *The Syntax and semantics of middle constructions: A study with special reference to German*. Cambridge University Press, Cambridge.

Fanselow, G. (1991). *Minimale Syntax*. PhD thesis, University of Passau.

Fotiadou, G. and Tsimpli, I. (2010). The acquisition of transitivity alternations in Greek: Does frequency count? *Lingua*, 120(11):2605–2626.

Fox, D. and Grodzinsky, Y. (1998). Children's passive: A view from the by-phrase. *Linguistic Inquiry*, 29(2):311–332.

Fox, D., Grodzinsky, Y., and Crain, S. (1995). An experimental study of children's passive. *MIT working papers in linguistics*, 26:249–264.

Givón, T. (1985). Ergative morphology and transitivity gradients in Newari. In Plank, F., editor, *Relational Typology*, pages 89–107. Mouton de Gruyter, Berlin.

Givón, T. (1995). *Functionalism and grammar*. John Benjamins, Amsterdam.

Gleitman, L. (1990). The Structural Sources of Verb Meanings. *Language Acquisition*, 1(1):3–55.

Gordon, P. (1998). The Truth-Value Judgment Task. In McDaniel, D., McKee, C., and Cairns, H., editors, *Methods for assessing children's syntax*, pages 211–232. MIT Press, Cambridge, MA.

Gordon, P. and Chafetz, J. (1990). Verb-based versus class-based accounts of actionality effects in children's comprehension of passives. *Cognition*, 36(3):227–254.

Grimshaw, J. (1981). Form, function, and the language acquisition device. In *The logical problem of language acquisition*, pages 165–182. MIT Press, Cambridge, MA.

Guasti, M. T. (2016). Voice Alternations (Active, Passive, Middle). In *The Oxford Handbook of Developmental Linguistics*, pages 1–29. Oxford University Press, Oxford.

Hartsuiker, R. J., Pickering, M. J., and Veltkamp, E. (2004). Is syntax separate or shared between languages? Cross-linguistic syntactic priming in Spanish-English bilinguals. *Psychological science*, 15(6):409–414.

Hatzidaki, A., Santesteban, M., and Duyck, W. (2018). Is language interference (when it occurs) a graded or an all-or-none effect? Evidence from bilingual reported speech production. *Bilingualism: Language and Cognition*, 21(3):489–504.

Hirsch, C. and Wexler, K. (2006). Children's passives and their resulting interpretation. In *The proceedings of the inaugural conference on generative approaches to language acquisition–North America, University of Connecticut Occasional Papers in Linguistics*, volume 2, pages 125–136, Storrs, CT.

Hopper, P. and Thompson, S. (1982). Studies in transitivity (Syntax and Semantics 15). *Journal of Linguistics*, 20(1):170–177.

Hopper, P. J. and Thompson, S. A. (1980). Transitivity in Grammar and Discourse. *Language*, 56(2):251–299.

Horgan, D. (1978). The development of the full passive. *Journal of Child Language*, 5(1):65–80.

Hyams, N., Ntelitheos, D., and Manorohanta, C. (2006). Acquisition of the Malagasy voicing system: implications for the adult grammar. *Natural Language & Linguistic Theory*, 24(4):1049–1092.

Israel, M., Johnson, C., and Brooks, P. J. (2000). From states to events: The acquisition of English passive participles. *Cognitive linguistics*, 11:103–130.

Jackendoff, R. (1990). On Larson's treatment of the double object construction. *Linguistic inquiry*, 21(3):427–456.

Jackendoff, R. (1992). *Semantic structures*, volume 18. MIT press, Cambridge, MA.

Jacobsen, W. M. (1985). Morphosyntactic transitivity and semantic markedness. *CLS*, 21:89–104.

Jaeger, T. F. (2008). Categorical Data Analysis: Away from ANOVAs (transformation or not) and towards Logit Mixed Models. *Journal of Memory and Language*, 59:434–446.

Jaeggli, O. (1986). Passive. *Linguistic Inquiry*, 17:587–622.

Jakubowicz, C. (1994). Reflexives in French and Danish: Morphology, syntax, and acquisition. *Binding, dependencies, and learnability*, pages 115–144.

Jakubowicz, C. and Nash, L. (2001). Functional categories and syntactic operations in (ab) normal language acquisition. *Brain and language*, 77(3):321–339.

Julien, M. (2016). Transitivity alternations in North Sámi. *Open Linguistics*, 2(1).

Kallulli, D. (2007). Rethinking the passive/anticausative distinction. *Linguistic Inquiry*, 38(4):770–780.

Kaltsa, M., Prentza, A., and Tsimpli, I. (2019). Input and literacy effects in simultaneous and sequential bilinguals: The performance of Albanian–Greek-speaking children in sentence repetition. *International Journal of Bilingualism*, pages 1–25.

Keenan, E. L. and Dryer, M. S. (2006). Passive in the world's languages. *Language Typology and Syntactic Description*, 1(2):325–361.

Kemmer, S. (1993). *The middle voice*, volume 23. John Benjamins Publishing, Amsterdam.

Kirby, S. (2010). Passives in first language acquisition: What causes the delay? In *Proceedings of the 33rd Annual Penn Linguistics Colloquium*, volume 16.

Kittilä, S. (2012). Transitivity Typology. In *The Oxford Handbook of Linguistic Typology*, pages 346–367. Oxford University Press, Oxford.

König, E. and Vezzosi, L. (2004). The role of predicate meaning in the development of reflexivity. In Bisang, W., Himmelmann, N., and Wiemer, B., editors, *What makes grammaticalization*, pages 213–244. Walter de Gruyter, Berlin.

Kratzer, A. (1996). Severing the external argument from its verb. In *Phrase structure and the lexicon*, pages 109–137. Springer, Dordrecht.

Kroll, J. F., Sumutka, B. M., and Schwartz, A. I. (2005). A cognitive view of the bilingual lexicon: Reading and speaking words in two languages. *International Journal of Bilingualism*, 9(1):27–48.

Landau, B. and Gleitman, L. R. (1985). *Language and experience: Evidence from the blind child*. Harvard University Press, Cambridge, MA.

Lasnik, H. and Chomsky, N. (1993). Principles and Parameters Theory. In Jacobs, J., editor, *Syntax: An International Handbook of Contemporary Research*, pages 505–569. de Gruyter, Berlin.

Lazard, G. (1998). *Actancy*. Mouton de Gruyter, Berlin.

Levin, B. (1991). *English Verb Classes and Alternations: A Preliminary Investigation*. The University of Chicago Press, Chicago.

Levin, B., Hovav, M. R., and Keyser, S. J. (1995). *Unaccusativity: At the syntax-lexical semantics interface*, volume 26. MIT press, Cambridge, MA.

Lindsey, J. K. (1997). *Generalized Linear Modelling*, pages 1–26. Springer, New York, NY.

Maratsos, M., Fox, D. E. C., Becker, J. A., and Chalkley, M. A. (1985). Semantic restrictions on children's passives. *Cognition*, 19(2):167–191.

Maratsos, M. P. (1974). Children Who Get Worse at Understanding the Passive : A Replication of Bever. *Journal of Psycholinguistic Research*, 3(1):65–74.

Maratsos, M. P. and Abramovitch, R. (1975). How children understand full, truncated, and anomalous passives. *Journal of Verbal Learning and Verbal Behavior*, 14(2):145–157.

McKee, C. (1992). A comparison of pronouns and anaphors in Italian and English acquisition. *Language acquisition*, 2(1):21–54.

Meisel, I. M. (2001). The simultaneous acquisition of two first languages. Early differentiation and subsequent development of the grammars. In Cenoz, J. and Genesee, F., editors, *Trends in bilingual acquisition*, volume 1, pages 11–42. John Benjamins Publishing, Amsterdam.

Meisel, J. M. (2011). Bilingual language acquisition and theories of diachronic change: Bilingualism as cause and effect of grammatical change. *Bilingualism: Language and Cognition*, 14(2):121–145.

Messenger, K., Branigan, H. P., and McLean, J. F. (2012). Is children's acquisition of the passive a staged process? Evidence from six-and nine-year-olds' production of passives. *Journal of Child Language*, 39(5):991–1016.

Mills, A. E. (1985). The acquisition of German. In Slobin, D., editor, *The cross-linguistic study of language acquisition*, volume 1, pages 141–254. Lawrence Erlbaum, Hillsdale, NJ.

Montrul, S. (2011). Introduction: The linguistic competence of heritage speakers. *Studies in Second Language Acquisition*, 33(2):155–161.

Müller, N. and Hulk, A. (2001). Crosslinguistic influence in bilingual language acquisition: Italian and French as recipient languages. *Bilingualism: Language and cognition*, 4(1):1–21.

Padilla, A. M. (1990). *Bilingual Education: Issues and Strategies.* SAGE Publications Ltd, Newbury Park, CA.

Paradis, J. (2011). Individual Differences in Child English Second Language Acquisition: Comparing Child-Internal and Child-External Factors. *Approaches to Bilingualism*, 1(3):213–237.

Paradis, J., Emmerzael, K., and Sorenson Duncan, T. (2010). Assessment of English Language Learners: Using Parent Report on First Language Development. *Journal of Communication Disorders*, 43:474–497.

Paradis, J. & Genesee, F. (1996). Syntactic acquisition in bilingual children: autonomous or independent? *Studies in Second Language Acquisition*, (18):1–25.

Perlmutter, D. (1978). Impersonal Passives and the Unaccusative Hypothesis. *Proceedings of the Annual Meeting of the Berkeley Linguistics Society*, 4:157–189.

Pinker, S. (1982). A theory of the acquisition of lexical interpretive grammars. In Bresnan, J., editor, *The mental representation of grammatical relations*, pages 655–726. MIT Press, Cambridge, MA.

Pinker, S. (1984). *Language Learnability and Language Development*. Harvard University Press, Cambridge, MA.

Pinker, S. (1994). *The Language Instinct*. Harper Perennial Modern Classics, New York, NY.

Pinker, S., Lebeaux, D. S., and Frost, L. A. (1987). Productivity and constraints in the acquisition of the passive. *Cognition*, 26(3):195–267.

Polinsky, M. (2011). Reanalysis in adult heritage language: New evidence in support of attrition. *Studies in second language acquisition*, 33(2):305–328.

R Core Team (2018). R: A language and environment for statistical computing. R Foundation for Statistical Computing.

Randall, J., van Hout, A., Weissenborn, J., and Baayen, H. (2004). Acquiring Unaccusativity: A cross-linguistic look. In Alexiadou, A., Anagnostopoulou, E., and Everaert, M., editors, *The Unaccusativity Puzzle*, pages 332–354. Oxford University Press, Oxford.

Reinhart, T. and Reuland, E. (1993). Reflexivity. *Linguistic inquiry*, 24(4):657–720.

Reinhart, T. and Siloni, T. (2004). Against the unaccusative analysis of reflexives. In Alexiadou, A., Anagnostopoulou, E., and Everaert, M., editors, *The Unaccusativity Puzzle*, pages 159–180. Oxford University Press, Oxford.

Renfrew, C. (1998). *The Renfrew Language Scales: Word Finding Vocabulary Test*. Speechmark, Milton Keynes.

Rivero, M.-L. (1990). The location of nonactive voice in Albanian and Modern Greek. *Linguistic Inquiry*, 21(1):135–146.

Rivero, M.-L. (1992). Adverb incorporation and the syntax of adverbs in Modern Greek. *Linguistics and philosophy*, 15(3):289–331.

Ruigendijk, E., Baauw, S., Avrutin, S., and Vasić, N. (2004). The production of SE- and SELF-anaphors in Dutch child language. In Brugos, A., L., M., and Smith, C., editors, *Boston University Conference on Language Development 28 Online Proceedings Supplement*. Cascadilla Press.

Schäfer, F. (2008). *The syntax of (anti-) causatives: External arguments in change-of-state contexts*, volume 126. John Benjamins Publishing.

Schmitz, K. and Müller, N. (2008). Strong and clitic pronouns in monolingual and bilingual acquisition of French and Italian. *Bilingualism: Language and Cognition*, 11(1):19–41.

Sells, P., Zaenen, A., and Zec, D. (1987). Reflexivization variation: Relations between syntax, semantics, and lexical structure. In Iida, M., Wechsler, S., and Zec, D., editors, *Working Papers in Grammatical Theory and Discourse Structure: Interactions of Morphology, Syntax, and Discourse*, pages 169–238. CSLI Publications, Stanford, CA.

Sinclair, A., Sinclair, H., and De Marcelus, O. (1971). Young children's comprehension and production of passive sentences. *Archives de psychologie*, 41:1–22.

Sorace, A. and Serratrice, L. (2009). Internal and external interfaces in bilingual language development: Beyond structural overlap. *International Journal of Bilingualism*, 13(2):195–210.

Steinbach, H.-M. G. and Gärtner, H. M. (2000). What do Reduced Pronominals Reveal about the Syntax of Dutch and German? In Gärtner, H. M., editor, *Linguistics in Potsdam*, volume 9, pages 7–62. University of Postdam.

Steinbach, M. (2002). *Middle voice*. John Benjamins, Amsterdam.

Stojanovic, D. (2002). I shave just like man': intrinsic and extrinsic reflexive constructions in child English. In Burelle, S. and Somesfalean, S., editors, *Proceedings of the 2002 Annual Canadian Linguistic Association Meeting*, pages 312–325.

Takahashi, N. (2003). On Unaccusativity. *Japanese/Korean Linguistics*, 11:221–243.

Terzi, A., Marinis, T., Francis, K., and Kotsopoulou, A. (2012). Crosslinguistic Differences in Autistic Children's Comprehension of Pronouns: English vs. Greek. In *BUCLD 36 Proceedings*. Cascadilla Press.

Terzi, A., Marinis, T., Kotsopoulou, A., and Francis, K. (2014). Grammatical abilities of Greek-speaking children with autism. *Language Acquisition*, 21(1):4–44.

Terzi, A. and Wexler, K. (2002). A-chains and S-homophones in children's grammar: Evidence from Greek passives. In *Proceedings of NELS*, volume 32, pages 519–538.

Tomasello, M. (2003). *Constructing a Language: A Usage-Based Theory of Language Acquisition*. Harvard University Press, Cambridge, MA.

Tomasello, M., Brooks, P. J., and Stern, E. (1998). Learning to produce passive utterances through discourse. *First Language*, 18(53):223–237.

Tsimpli, I. (1989). On the properties of the passive affix in Modern Greek. *Working Papers in Linguistics, University College London*, 1:235–261.

Tsimpli, I. (2006). The acquisition of voice and transitivity alternations in Greek as native and second language. In Unsworth, S., Parodi, T., Sorace, A., and Young-Sholten, M., editors, *Paths of Development in L1 and L2 Acquisition*, pages 15–55. John Benjamins Publishing Company, Amsterdam.

Tsimpli, I. (2014). Early, late or very late: Timing acquisition and bilingualism: A reply to peer commentaries. *Linguistic Approaches to Bilingualism*, 4(3):393–402.

Tsimpli, I. (2017). Crosslinguistic influence is not necessarily attrition. *Linguistic Approaches to Bilingualism*, 7(6):759–762.

Unsworth, S., Argyri, F., Cornips, L., Hulk, A., Sorace, A., and Tsimpli, I. (2011). Bilingual acquisition of Greek voice morphology and Dutch gender: What do they have in common. In Danis, N., Mesh, K., and Sung, H., editors, *Proceedings of the 35th annual Boston University Conference on Language Development*, pages 590–602, Somerville, MA. Cascadilla Press.

Verrips, M. (2000). Passives and implicit arguments in child language. In *Proceedings of the 24th Annual Boston University Conference on Language Development*, pages 749–760, Somerville, MA. Cascadilla Press.

Vogindroukas, I., Protopapas, A., and Sideris, G. (2009). Experiment on the expressive vocabulary. *Chania: Glafki*.

Wasow, T. (1977). Transformations and the Lexicon. In Culicover, P., Wasow, T., and Bresnan, J., editors, *Formal Syntax*, pages 327–360. New York: Academic Press, Naw York, NY.

Wexler, K. (2004). Theory of phasal development: Perfection in child grammar. *MIT Working Papers in Linguistics*, 48:159–209.

Williams, E. (1981). Argument structure and morphology. *The linguistic review*, 1(1):81–114.

Winskel, H. (2004). The acquisition of temporal reference cross-linguistically using two acting-out comprehension tasks. *Journal of psycholinguistic research*, 33(4):333–355.

Zombolou, K. (2004). *Verbal alternations in Greek: a semantic analysis*. PhD thesis, University of Reading.

Zombolou, K. (2011). Attrition in Greek Diaspora: grammars in contact or incomplete acquisition? *Language Contact and Language Shift: Grammatical and Sociolinguistic Perspectives*, pages 111–139.

Zombolou, K. and Alexiadou, A. (2012a). Early voice acquisition of heritage Greek in Germany. In *Formal Approaches to Heritage Language*. University of Massachusetts.

Zombolou, K. and Alexiadou, A. (2012b). Incomplete acquisition of anticausatives in heritage speakers of Spanish-Greek and English-Greek bilingual adults. In *Variation in Language Acquisition*, Münster. University of Münster.

Zombolou, K. and Alexiadou, A. (2012c). The acquisition of reflexives and anticausatives by L1-German children. In *Acquisition at the Interface*, Tromso. University of Tromso.

Zombolou, K. and Alexiadou, A. (2013). The canonical function of the deponent verbs in modern Greek. *Current Issues in Linguistic Theory*, 327:331–344.

Zombolou, K., Varlokosta, S., and Alexiadou, A. (2010). Acquiring Anticausatives versus Passives in Greek. In *Proceedings of the 34th annual Boston University Conference on Language Development 2009*, volume 2, pages 515–524, Somerville, MA. Cascadilla Press.

Appendix A

Consent forms, information sheets and questionnaires

HUMBOLDT-UNIVERSITÄT ZU BERLIN

HU | PhilFak II, Institut für Anglistik und Amerikanistik | Unter den Linden 6, 10099 Berlin

Prof. Dr. Artemis Alexiadou

Raum 2008c

E-Mail: artemis.alexiadou@hu-berlin.de

Telefonnummer: +49 (0)30 2093-2316

Μελέτη της διγλωσσίας Ελληνικά-Γερμανικά στο πανεπιστήμιο Humboldt του Βερολίνου

Αξιότιμοι αγαπητοί γονείς,

Επιτρέψτε μας να σας συστηθούμε: Είμαστε η Άρτεμις Αλεξιάδου και η Χριστίνα Γκρέυ. Είμαστε γλωσσολόγοι και δουλεύουμε στο πανεπιστήμιο Humboldt του Βερολίνου. Τον Οκτώβριο του 2013 ξεκινήσαμε ένα νέο ερευνητικό γλωσσολογικό πρόγραμμα που μελετάει τα δίγλωσσα παιδιά ηλικίας 3-8 χρονών που μαθαίνουν Ελληνικά και Γερμανικά. Σκοπός μας είναι να εξετάσουμε πως εξελίσσονται οι δυο γλώσσες των παιδιών σε αυτή τη νεαρή ηλικία.

Και πιο συγκεκριμένα μελετάμε την μεσοπαθητική φωνή και διάθεση στα Ελληνικά και στα Γερμανικά. Η μεσοπαθητική φωνή και διάθεση συμπεριλαμβάνει ρήματα όπως πλένω/πλένομαι, χτενίζω/χτενίζομαι, αλλά επίσης και ρήματα όπως κοιμάμαι και χαίρομαι. Εμείς μελετάμε την γλώσσα των δίγλωσσων παιδιών για να δούμε σε ποια ηλικία αρχίζουν να χρησιμοποιούνται αυτά τα ρήματα και αν χρησιμοποιούνται το ίδιο και στην Γερμανική και στην Ελληνική.

Η μελέτη θα πραγματοποιηθεί στο παιδικό σταθμό/δημοτικό σχολείο του παιδιού σας. Θα υπάρξουν δύο συνεδρίες περίπου 30 λεπτά η καθεμία. Κατά τη διάρκεια αυτών των δύο συνεδριών, το παιδί θα κάνει ένα τεστ λεξιλογίου έτσι ώστε οι ερευνήτριες να αξιολογήσουν τη γλωσσική του ικανότητα. Σε μία από τις δύο συνεδρίες, το παιδί θα παρακολουθήσει μερικά σύντομα βίντεο και θα πρέπει να απαντήσει σε μια ερώτηση στα Ελληνικά σχετική με το εκάστοτε βίντεο. Η άλλη συνεδρία θα μαγνητοσκοπηθεί επειδή το παιδί θα χρησιμοποιήσει παιχνίδια για να αναπαραστήσει μια πρόταση που θα ακούσει από την ερευνήτρια. Ο φακός της κάμερας θα επικεντρωθεί στα παιχνίδια και στην απίθανη περίπτωση που το παιδί βρεθεί σε οποιοδήποτε από τα βίντεο, αυτά θα διαγραφούν. Οι εγγραφές θα αναγνωρίζονται μόνο με έναν κωδικό και δεν θα χρησιμοποιηθούν ούτε θα διατεθούν για άλλους σκοπούς εκτός από το ερευνητικό έργο. Τα βίντεο θα καταστραφούν στο τέλος της μελέτης. Κανείς άλλος εκτός από τις ερευνήτριες δεν θα έχει πρόσβαση σε αυτά τα βίντεο. Όλα τα δεδομένα που συλλέγονται θα είναι ανώνυμα.

Η συνάντηση με τα παιδιά θα γίνει σε ένα χώρο του παιδικού σταθμού/δημοτικού σχολείου και παρουσία μιας νηπιαγωγού/δασκάλας. Μια μέρα πριν θα επισκεφτούμε τον παιδικό σταθμό/δημοτικό σχολείο και θα παίξουμε με τα παιδιά για να μας γνωρίσουν και να τα γνωρίσουμε.

Την ημέρα που θα ξεκινήσουμε την μελέτη με τα παιδιά θα τα ρωτήσουμε αν θέλουν να δούνε τις εικόνες και μόνο αν συμφωνήσουν θα τους τις δείξουμε. Στην αντίθετη περίπτωση, θα σεβαστούμε την επιθυμία των παιδιών. Επίσης θα σεβαστούμε την επιθυμία των παιδιών αν θα

θελήσουν να διακόψουν καθώς βλέπουμε τις εικόνες. Στο τέλος θα ευχαριστήσουμε όλα τα παιδιά και θα επιστρέψουν στο γκρουπάκι τους.

Όλες τα βίντεο και τις προτάσεις θα τις παρουσιάσουμε στην διευθύντρια του παιδικού σταθμού/ δημοτικού σχολείου σας. Πολύ ευχαρίστως να το δείξουμε και σε σας τους ίδιους, αν σας ενδιαφέρει.

Για να καταλάβουμε καλύτερα την γλώσσα των παιδιών πρέπει να μελετήσουμε και την γλώσσα των μεγάλων του περιβάλλοντός τους γιατί από αυτούς μαθαίνουν την γλώσσα. **Για αυτό τον λόγο θα θέλαμε να σας παρακαλέσουμε να συμπληρώσετε ένα σύντομο ερωτηματολόγιο σχετικά με την χρονική πορεία της κατάκτησης των δύο γλωσσών.**

Όλα τα προσωπικά και γλωσσικά στοιχεία που θα συλλέξουμε κατα τη διάρκεια της μελέτης μας θα μείνουν εντελώς ανώνυμα και θα τα χρησιμοποιήσουμε για επιστημονικούς σκοπούς και μόνο. Πολύ ευχαριστώς να σας δώσουμε και ένα αντίγραφο της καταγραφής της ομιλίας που θα κάνουμε.

Περισσότερες πληροφορίες για το πρόγραμμα και για μας τις ίδιες μπορείτε επίσης να διαβάσετε στο ίντερνετ στην ιστοσελίδα του πανεπιστημίου μας https://www.angl.hu-berlin.de/department/staff/artemis_alexiadou

Για οποιεσδήποτε ερωτήσεις και πληροφορίες μπορείτε επίσης να έρθετε σε επαφή μαζί μας:

Christina Grey
Wissenschaftliche Mitarbeiterin
Institut für Anglistik & Amerikanistik
Humboldt-Universität zu Berlin

Postanschrift:
Unter den Linden 6
10099 Berlin

Büro:
Invalidenstraße 110
10115 Berlin
Raum 324

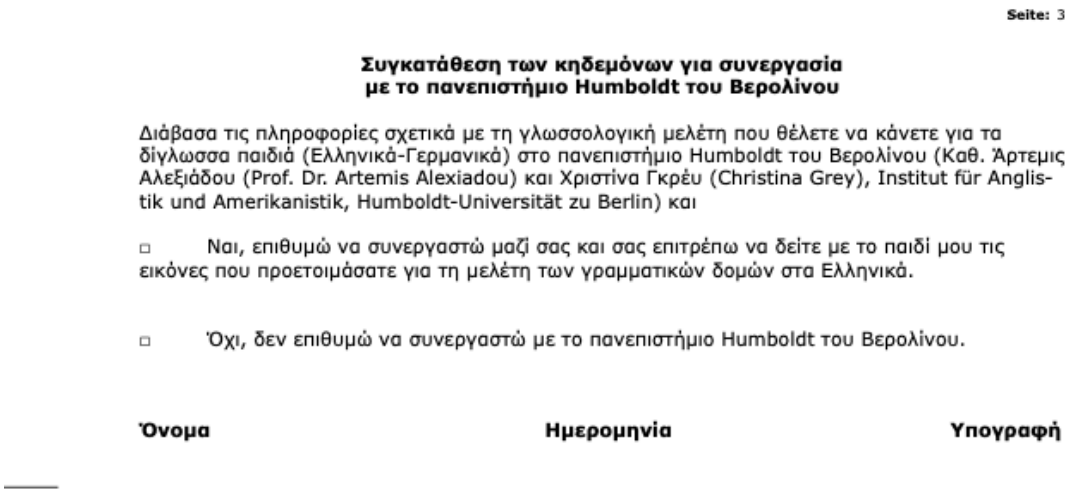
christina.grey@hu-berlin.de
030 2093-92337
01607149866

Εαν επιθυμείτε να συμμετάσχετε σε αυτή τη μελέτη θα σας παρακαλούσαμε να υπογράψετε
την συγκατάθεσή σας και να τη δώσετε στην διευθύντρια του παιδικού σταθμού/ δημοτικού σχολείου σας.

Χαιρόμαστε πάρα πολύ και σας ευχαριστούμε εκ των προτέρων για την συνεργασία!

Τους εγκάρδιους χαιρετισμούς μας,

Καθηγήτρια Άρτεμις Αλεξιάδου Χριστίνα Γκρέυ



Seite: 3

Συγκατάθεση των κηδεμόνων για συνεργασία με το πανεπιστήμιο Humboldt του Βερολίνου

Διάβασα τις πληροφορίες σχετικά με τη γλωσσολογική μελέτη που θέλετε να κάνετε για τα δίγλωσσα παιδιά (Ελληνικά-Γερμανικά) στο πανεπιστήμιο Humboldt του Βερολίνου (Καθ. Άρτεμις Αλεξιάδου (Prof. Dr. Artemis Alexiadou) και Χριστίνα Γκρέυ (Christina Grey), Institut für Anglistik und Amerikanistik, Humboldt-Universität zu Berlin) και

□ Ναι, επιθυμώ να συνεργαστώ μαζί σας και σας επιτρέπω να δείτε με το παιδί μου τις εικόνες που προετοιμάσατε για τη μελέτη των γραμματικών δομών στα Ελληνικά.

□ Όχι, δεν επιθυμώ να συνεργαστώ με το πανεπιστήμιο Humboldt του Βερολίνου.

Όνομα **Ημερομηνία** **Υπογραφή**

Fig. A.1 Information sheet and consent form in Greek used in Berlin, Germany to recruit Greek-German bilinguals
This was given to the parents who consented to participate in the study

HUMBOLDT-UNIVERSITÄT ZU BERLIN

HU | PhilFak II, Institut für Anglistik und Amerikanistik | Unter den Linden 6, 10099 Berlin

Prof. Dr. Artemis Alexiadou

Raum 2008c

E-Mail: artemis.alexiadou@hu-berlin.de

Telefonnummer: +49 (0)30 2093-2316

Betr.: Zusammenarbeit mit der Humboldt-Universität zu Berlin

Sehr geehrte Eltern,

erlauben Sie uns, uns kurz vorzustellen. Wir sind Artemis Alexiadou und Christina Grey.
Wir sind Sprachwissenschaftlerinnen und arbeiten an der Humboldt-Universität zu Berlin. Im Oktober 2013 hat bei uns ein neues sprachwissenschaftliches Forschungsprojekt begonnen, das sich mit dem Spracherwerb von 3 bis 8-jährigen Kindern beschäftigt, sowohl einsprachigen (Deutsch oder Griechisch sprechenden) Kindern als auch zweisprachigen (Deutsch-Griechisch) Kindern. Bei unseren Studien geht es um die Frage, wie sich der Spracherwerb der Kinder im Laufe der ersten Jahre entwickelt bzw. ob Ähnlichkeiten/Unterschiede zwischen den einsprachigen und den zweisprachigen Kinder bestehen.

Konkret möchten wir untersuchen, ob die Kinder in diesem frühen Alter Sätze wie z.B. „Der Junge freut sich" oder „Das Kind wird von der Mama gefüttert" selbst anwenden können bzw. wie die Kinder mit dem Reflexivpronomen „sich" oder mit passiven Konstruktionen umgehen können.

Für unsere Studien möchten wir eine kurze Sprachstudie machen, wozu wir Sie bitten möchten, uns zu genehmigen, diese mit Ihrem Kind durchzuführen.

Es wird insgesamt zwei Sitzungen von jeweils 30 Minuten geben. Während dieser zwei Sitzungen erhält das Kind einen Wortschatztest auf griechisch, damit die Forscher ihre Sprachkompetenz beurteilen können. In einer der beiden Sitzungen wird das Kind mehrere kurze Videos sich anschauen und wird dazu eine Frage beantworten. Die Videos zeigen Szenen aus dem Alltag einer Familie (z.B. wie das Kind sich wäscht, sich kämmt und ähnliche Szenen) und die Fragen werden auf Griechisch gestellt. Die zweite Sitzung wird auf Video aufgezeichnet, da das Kind Spielzeuge verwenden muss, um einen ausgesprochenen Satz auszugeben. Das Kameraobjektiv wird auf die Spielzeuge fokussiert sein und in dem unwahrscheinlichen Fall, dass sich das Kind in einem der Videos befindet, werden diese entsprechend gelöscht. Aufnahmen werden nur durch einen Code identifiziert und nicht für andere Zwecke als das Forschungsprojekt verwendet oder zur Verfügung gestellt. Diese Aufnahmen werden am Ende der Studie gelöscht.
Diese Studie werden wir in einem Raum der Tageseinrichtung und in Anwesenheit einer pädagogischen Fachkraft dieser Tageseinrichtung durchführen. An ein bis zwei Tagen vor der Durchführung der Studie werden wir die Kinder in ihrer Tageseinrichtung besuchen und mit ih-

nen einige Stunden in ihrem Alltag verbringen, um ein gegenseitiges Kennenlernen zu ermöglichen.

Vor der Durchführung der Studie werden wir die Kinder freundlich fragen, ob sie sich an der Studie beteiligen möchten. Wenn sich die Kinder an der Studie nicht beteiligen möchten, wird das respektiert. Möchten die Kinder während der Studie nicht mehr weitermachen, wird die Studie selbstverständlich abgebrochen. Am Ende der Studie wird allen Kindern herzlich gedankt und sie werden zu ihrer Gruppe zurückgebracht.

Die Bilder und die Videos, die für die Durchführung der Studie verwendet werden, werden der Leitung der Tageseinrichtungen bei einer Vorbesprechung vorgeführt. Gerne zeigen wir es auch Ihnen bei Interesse.

Der Sprachhintergund der Kinder ist für unsere Studien sehr wichtig. Um die Entwicklung des Spracherwerbs der Kinder besser verstehen zu können, ist es wichtig, die Sprache der Kinder mit der der Erwachsenen in ihrer Umgebung zu vergleichen. Deshalb möchten wir Sie bitten, einen Fragebogen zum zeitlichen Verlauf des Spracherwerbs des Kindes auszufüllen.

Die in der Studie aufgenommenen Sprachdaten sind selbstverständlich anonym und werden diskret behandelt. Sie werden nur für wissenschaftliche Zwecke benutzt. Eine Kopie der Aufnahme würden wir Ihnen sehr gerne und bei Interesse zukommen lassen.

Mehr Information zu unserem Projekt sowie über uns selbst finden Sie auf unserer Internetseite: https://www.angl.hu-berlin.de/department/staff/artemis_alexiadou

Für weitere Fragen stehen wir Ihnen selbstverständlich gerne zur Verfügung:

Christina Grey
Wissenschaftliche Mitarbeiterin
Institut für Anglistik & Amerikanistik
Humboldt-Universität zu Berlin

Postanschrift:
Unter den Linden 6
10099 Berlin

Büro:
Invalidenstraße 110
10115 Berlin
Raum 324

christina.grey@hu-berlin.de
030 2093-92337
01607149866

Wenn Sie uns genehmigen, mit Ihrem Kind die oben erwähnte Studie durchzuführen, möchten wir Sie bitten, die beigefügte Einverständniserklärung zu unterschreiben und bei der Leitung Ihrer Tageseinrichtung abzugeben.

Für Ihre Zusammenarbeit bedanken wir uns herzlich im Voraus.

Mit freundlichen Grüßen,

Prof. Dr. Artemis Alexiadou Christina Grey

Einverständniserklärung der Eltern

bezüglich der Sprachstudie der Humboldt-Universität zu Berlin

Ich habe die Information über die sprachwissenschaftliche Studie zum Spracherwerb von zweisprachigen Kindern an der Humboldt-Universität zu Berlin (Institut für Anglistik und Amerikanistik, Prof. Dr. Artemis Alexiadou & Christina Grey) gelesen und

□ Ja, ich möchte gerne mit Ihnen zusammenarbeiten und genehmige Ihnen, die oben erwähnte Sprachstudie mit meinem Kind durchzuführen.

□ Nein, ich möchte nicht mit der Humboldt-Universität zu Berlin zusammenarbeiten.

Name **Datum** **Unterschrift**

Fig. A.2 Information sheet and consent form in German used in Berlin, Germany to recruit Greek-German bilinguals
This was given to the parents who consented to participate in the study

HUMBOLDT-UNIVERSITÄT ZU BERLIN

Ερωτηματολόγιο για τη χρήση της γλώσσας

Να συμπληρωθεί από έναν από τους κηδεμόνες του παιδιού (π.χ. μητέρα, πατέρας, γιαγιά, παππούς κλπ.)

Η σχέση σας με το παιδί (π.χ. μητέρα, πατέρας, γιαγιά, παππούς κτλ.)

Ονοματεπώνυμο:

Ημερομηνία συμπλήρωσης:

Σημείωση: Τα στοιχεία θα είναι ανώνυμα. Κανείς δεν θα έχει πρόσβαση στο όνομά σας ή στο όνομα του παιδιού σας, εκτός από τις ερευνήτριες (Χριστίνα Γκρέυ και Άρτεμις Αλεξιάδου). Δεν θα χρησιμοποιηθεί κανένα πραγματικό όνομα σε καμία αναφορά ή δημοσίευση.

ΣΑΣ ΕΥΧΑΡΙΣΤΟΥΜΕ ΠΟΛΥ ΠΟΥ ΑΦΙΕΡΩΣΑΤΕ ΤΟ ΧΡΟΝΟ ΓΙΑ ΝΑ ΣΥΜΠΛΗΡΩΣΕΤΕ ΑΥΤΟ ΤΟ ΕΡΩΤΗΜΑΤΟΛΟΓΙΟ. ΠΑΡΑΚΑΛΟΥΜΕ ΝΑ ΤΟ ΕΠΙΣΤΡΕΨΕΤΕ ΣΤΟ ΣΤΑΘΜΟ ΣΥΜΠΛΗΡΩΜΕΝΟ ΜΕΧΡΙ ΤΙΣ **23 ΜΑΡΤΙΟΥ**

Εάν έχετε οποιεσδήποτε ερωτήσεις, μη διστάσετε να έρθετε σε επαφή με την ερευνήτρια: Χριστίνα Γκρέυ - christina.grey@hu-berlin.de.

- **Γενικές πληροφορίες σχετικά με το παιδί:**

1.1 Ονοματεπώνυμο παιδιού:

1.2 Ημερομηνία γέννησης παιδιού:

1.3 Ηλικία παιδιού:

1.4 Φύλο παιδιού:

1.5 Τόπος γέννησης παιδιού (πόλη και χώρα):

1.6 Αν ο τόπος γέννησης του παιδιού δεν αντιστοιχεί στη σημερινή χώρα κατοικίας, γράψτε την ημερομηνία άφιξης στη σημερινή χώρα κατοικίας:

1.7 Ποιες γλώσσες μιλάει και/ή καταλαβαίνει το παιδί σας; Βάλτε ✓ στα Ελληνικά και στα Γερμανικά και σημειώστε κάθε επιπλέον γλώσσα στο αντίστοιχο κουτάκι του πίνακα. Παρακαλώ γράψτε κάθε γλώσσα που μιλάει/καταλαβαίνει το παιδί, ακόμη κι αν έχει περιορισμένη ικανότητα σε αυτήν.

Ελληνικά	
Γερμανικά	
Άλλη γλώσσα Α:	
Άλλη γλώσσα Β:	

- **Πληροφορίες σχετικά με τις γλωσσικές ικανότητες του παιδιού και την έκθεσή του στη γλώσσα**

2.1 Σε ποια ηλικία ξεκίνησε το παιδί σας να εκτίθεται συστηματικά σε κάθε μία από τις γλώσσες του/της;

Γλώσσα	**Ηλικία (σε χρόνια και μήνες)**
Ελληνικά	
Γερμανικά	
Άλλη γλώσσα Α	
Άλλη γλώσσα Β	

Τι εννοούμε με το "συστηματικά": το παιδί ξεκίνησε να πηγαίνει σε σχολείο (π.χ. νηπιαγωγείο /δημοτικό /ολοήμερο) όπου δίνονται οδηγίες σε αυτήν τη γλώσσα ή κάποιος από τους κηδεμόνες (π.χ. γονείς, νταντά, κτλ.) του παιδιού ξεκίνησε να χρησιμοποιεί συστηματικά αυτή τη γλώσσα με το παιδί.

2.2 Πόσο καλά πιστεύετε ότι το παιδί σας **μιλάει** την κάθε γλώσσα; Σημειώστε ✓ στο κατάλληλο κουτάκι.

	Έλλειψη ευχέρειας λόγου	**Περιορισμένη ευχέρεια λόγου**	**Σχετική ευχέρεια λόγου**	**Αρκετή ευχέρεια λόγου**	**Μεγάλη ευχέρεια λόγου**
	Μικρή ικανότητα στην προφορική έκφραση	Μερική ικανότητα. Μπορεί να παράγει μικρές, απλές προτάσεις π.χ. να απαντήσει στο τηλέφωνο ή να χαιρετήσει έναν γείτονα	Καλή προφορική έκφραση, μπορεί να μιλήσει για διάφορα θέματα π.χ. να εξηγήσει τι θέλει, να δώσει πληροφορίες	Μπορεί να χρησιμοποιήσει τη γλώσσα επαρκώς στις περισσότερες περιστάσεις	Μπορεί να εκφράζεται με άνεση στη γλώσσα σε κάθε περίσταση
ΕΛΛ					
ΓΕΡΜ					
Α					
Β					

2.3 Πόσο καλά πιστεύετε ότι είναι το παιδί σας **καταλαβαίνει** κάθε γλώσσα; Σημειώστε ✓ στο κατάλληλο κουτάκι.

	Όχι επαρκής κατανόηση	**Περιορισμένη κατανόηση**	**Σχετική κατανόηση**	**Αρκετή κατανόηση**	**Μεγάλη κατανόηση**
	Μικρή ικανότητα κατανόησης	Μερική κατανόηση π.χ. μπορεί να καταλάβει απλούς διαλόγους	Καλή κατανόηση του 45% έως 55% της επικοινωνίας	Μπορεί να κατανοήσει τη γλώσσα επαρκώς στις περισσότερες περιστάσεις, π.χ. να παρακολουθήσει ταινίες ή εκπομπές	Καταλαβαίνει σχεδόν τα πάντα
ΕΛΛ					
ΓΕΡΜ					
Α					
Β					

- **Πληροφορίες σχετικά με τη χρήση της γλώσσας μεταξύ των κηδεμόνων και του παιδιού**

3.1 Τι γλώσσα/-ες μιλάτε **ΕΣΕΙΣ** με το παιδί σας; **(**Παρακαλώ κυκλώστε έναν από τους αριθμούς από το 1 έως το 5)

1	2	3	4	5
Ελληνικά ποτέ Γερμανικά πάντα	Ελληνικά σπάνια Γερμανικά συνήθως	Ελληνικά 50% Γερμανικά 50%	Ελληνικά συνήθως Γερμανικά σπάνια	Ελληνικά πάντα Γερμανικά ποτέ

3.2 Ποιες γλώσσες μιλάει το παιδί μαζί **ΣΑΣ**; **(**Παρακαλώ κυκλώστε έναν από τους αριθμούς από το 1 έως το 5)

1	2	3	4	5
Ελληνικά ποτέ Γερμανικά πάντα	Ελληνικά σπάνια Γερμανικά συνήθως	Ελληνικά 50% Γερμανικά 50%	Ελληνικά συνήθως Γερμανικά σπάνια	Ελληνικά πάντα Γερμανικά ποτέ

3.3 Πόσο συχνά διαβάζετε **ΕΣΕΙΣ** στο παιδί σας; **(**Παρακαλώ κυκλώστε έναν από τους αριθμούς από το 1 έως το 5)

1	2	3	4	5
Ποτέ	Σπάνια	Μερικές φορές	Πολύ συχνά	Κάθε μέρα

3.4 Σε ποιες γλώσσες **διαβάζετε** στο παιδί σας; **(**Παρακαλώ κυκλώστε έναν από τους αριθμούς από το 1 έως το 5)

1	2	3	4	5
Ελληνικά ποτέ Γερμανικά πάντα	Ελληνικά σπάνια Γερμανικά συνήθως	Ελληνικά 50% Γερμανικά 50%	Ελληνικά συνήθως Γερμανικά σπάνια	Ελληνικά πάντα Γερμανικά ποτέ

3.5 Ποιες γλώσσες **μιλάει** ο άλλος κηδεμόνας (αν υπάρχει) με το παιδί; **(**Παρακαλώ κυκλώστε έναν από τους αριθμούς από το 1 έως το 5)

1	2	3	4	5
Ελληνικά ποτέ Γερμανικά πάντα	Ελληνικά σπάνια Γερμανικά συνήθως	Ελληνικά 50% Γερμανικά 50%	Ελληνικά συνήθως Γερμανικά σπάνια	Ελληνικά πάντα Γερμανικά ποτέ

3.6 Ποιες γλώσσες μιλάει το παιδί **με τον άλλο κηδεμόνα** (αν υπάρχει); **(**Παρακαλώ κυκλώστε έναν από τους αριθμούς από το 1 έως το 5)

1	2	3	4	5
Ελληνικά ποτέ Γερμανικά πάντα	Ελληνικά σπάνια Γερμανικά συνήθως	Ελληνικά 50% Γερμανικά 50%	Ελληνικά συνήθως Γερμανικά σπάνια	Ελληνικά πάντα Γερμανικά ποτέ

3.7 Πόσο συχνά διαβάζει **ο άλλος κηδεμόνας** (αν υπάρχει) στο παιδί; **(**Παρακαλώ κυκλώστε έναν από τους αριθμούς από το 1 έως το 5)

1	2	3	4	5
Ποτέ	Σπάνια	Μερικές φορές	Πολύ συχνά	Κάθε μέρα

3.8 Σε ποιες γλώσσες διαβάζει **ο άλλος κηδεμόνας** (αν υπάρχει) στο παιδί; **(**Παρακαλώ κυκλώστε έναν από τους αριθμούς από το 1 έως το 5)

1	2	3	4	5
Ελληνικά ποτέ Γερμανικά πάντα	Ελληνικά σπάνια Γερμανικά συνήθως	Ελληνικά 50% Γερμανικά 50%	Ελληνικά συνήθως Γερμανικά σπάνια	Ελληνικά πάντα Γερμανικά ποτέ

- **Πληροφορίες σχετικά με την οικογένεια**

4.1 Γενικές πληροφορίες

Παρακαλώ κυκλώστε την απάντησή σας. (Σημείωση: Οι παρακάτω ερωτήσεις είναι μόνο για δημογραφικούς λόγους**)**

Η οικογένειά σας έχει αυτοκίνητο;	Όχι	Ναι, μόνο ένα	Ναι, πάνω από ένα	
Τα τελευταία χρόνια, πόσες φορές κάνατε κάποιο ταξίδι σαν οικογένεια;	Καμία	Μία	Δύο	Περισσότερες από δύο
Πόσους υπολογιστές (φορητούς ή σταθερούς) έχει η οικογένειά σας;	Κανέναν	Έναν	Δύο	Περισσότερους από δύο
Το παιδί έχει δικό του δωμάτιο;	Όχι	Ναι		

4.2 Πληροφορίες σχετικά με ΕΣΑΣ

4.2.1 Εκπαίδευση: Παρακαλώ κυκλώστε το επίπεδο εκπαίδευσης που **έχετε ολοκληρώσει.**

Η εκπαίδευσή σας	**Η εκπαίδευση του άλλου κηδεμόνα (αν υπάρχει). Παρακαλώ αναφέρετε τη σχέση με το παιδί _____**
Δημοτικό Σχολείο	Δημοτικό Σχολείο
Γυμνάσιο	Γυμνάσιο
Λύκειο	Λύκειο
Πανεπιστήμιο - Πτυχίο (ή ΤΕΙ)	Πανεπιστήμιο - Πτυχίο (ή ΤΕΙ)
Πανεπιστήμιο - Μεταπτυχιακό	Πανεπιστήμιο - Μεταπτυχιακό
Πανεπιστήμιο - Διδακτορικό	Πανεπιστήμιο - Διδακτορικό
Άλλο (διευκρινίστε)	Άλλο (διευκρινίστε)

4.2.2 Ποιες γλώσσες μιλάτε **ΕΣΕΙΣ**; (Παρακαλώ σημειώστε ✓ στο κατάλληλο κουτάκι.)

	Οι γλώσσες σας	**Οι γλώσσες του άλλου κηδεμόνα**
Ελληνικά		
Γερμανικά		

Fig. A.3 Questionnaire for Greek-German bilinguals in Greek used in Berlin, Germany
This was given to the parents who consented to participate in the study

HUMBOLDT-UNIVERSITÄT ZU BERLIN

Sprachenfragebogen

Zum ausfüllen von einem der Erziehungsberechtigten (zB Mutter, Vater, Großmutter, Großvater usw.)

Ihre Beziehung zum Kind (zB Mutter, Vater, Großmutter, Großvater, usw..)

Ihr Vor- und Nachname:

Datum der Fertigstellung:

Hinweis: Die Daten der Kinder werden anonym sein. Außer den beiden Forscherinnen (Christina Grey und Artemis Alexiadou) hat niemand Zugang zu Ihrem Namen oder den Namen Ihres Kindes. In keiner Referenz oder Publikation wird ein richtiger Name verwendet.

DANKE, DASS SIE DIE ZEIT GENOMMEN HABEN, DIESEN BOGEN AUSZUFÜLLEN. BITTE GEBEN SIE IHN IN DER KITA AB BIS ZUM **23 MÄRZ**

Wenn Sie Fragen haben sollen, bitte setzen Sie sich in Kontakt mit der Forscherin: Christina Grey - christina.grey@hu-berlin.de oder 01607149866

- **Allgemeine Informationen über das Kind:**

1.1 Vor- und Nachname des Kindes:

1.2 Geburtsdatum des Kindes:

1.3 Alter des Kindes

1.4 Geschlecht des Kindes:

1.5 Geburtsort des Kindes (Stadt und Land):

1.6 Wenn der Geburtsort des Kindes nicht dem aktuellen Aufenthaltsland entspricht, notieren Sie das Datum der Ankunft im aktuellen Aufenthaltsland:

1.7 Welche Sprachen spricht und/oder versteht Ihr Kind? Setzen Sie ✓ auf Griechisch und Deutsch und markieren Sie jede weitere Sprache in der entsprechenden Box. Bitte schreiben Sie jede Sprache, die das Kind spricht, auch wenn es eine begrenzte Fähigkeit hat.

Griechisch	
Deutsch	
Andere Sprache A:	
Andere Sprache B:	

- **Informationen zu den Sprachkenntnissen des Kindes und zu seiner/ihrer Exposition gegenüber der Sprache**

2.1 In welchem Alter begann Ihr Kind systematisch in jeder seiner eigenen Sprachen ausgesetzt zu werden?

Sprache	**Alter (in Jahren und Monaten)**
Griechisch	
Deutsch	
Andere Sprache A	
Andere Sprache B	

Was wir mit "systematisch" meinen: Das Kind ging in die Schule (zB Kindergarten), wo Anweisungen in dieser Sprache erteilt werden, oder einer der Erziehungsberechtigten (zB Eltern usw..) begann diese Sprache systematisch mit dem Kind zu benutzen.

2.2 Nach Ihrer Schätzung wie gut **spricht** das Kind jede Sprache? Setzen Sie ✓ in der entsprechenden Box.

	Mangel an Sprache	**Eingeschränkt gesprochen**	**Etwas flüssig**	**Spricht flüssig**	**Sehr flüssig**
	Wenig Fähigkeit im mündlichen Ausdruck	Es kann kleine, einfache Sätze und Vorschläge machen zB ans Telefon gehen oder einen Nachbarn grüßen	Guter mündlicher Ausdruck, kann über verschiedene Themen sprechen zB. erklären, was er/sie will, kann Informationen geben	Es kann die Sprache in den meisten Fällen angemessen verwenden	Es kann sich in der Sprache in jeder Situation bequem ausdrücken
GR					
DE					
A					
B					

2.3 Nach Ihrer Schätzung wie gut **versteht** das Kind jede Sprache? Setzen Sie ✓ in der entsprechenden Box.

	Nicht genug Verständnis	**Begrenztes Verständnis**	**Relatives Verständnis**	**Viel Verständnis**	**Großes Verständnis**
	Wenig Fähigkeit zu verstehen	Teilverständnis, zB kann einfache Dialoge verstehen	Gutes Verständnis von 45% bis 55% der Kommunikation	Kann die Sprache in den meisten Fällen angemessen verstehen, zB schaut Filme oder Shows an	Versteht fast alles
GR					
DE					
A					
B					

- **Informationen zum Gebrauch der Sprache zwischen dem Erziehungsberechtigten und dem Kind**

3.1 Welche Sprache(n) sprechen **SIE** mit Ihrem Kind? (Bitte eine der Zahlen von 1 bis 5 umkreisen)

1	2	3	4	5
Griechisch nie Deutsch immer	Griechisch selten In der Regel Deutsch	Griechisch 50% Deutsch 50%	Griechisch normelerweise Deutsch selten	Griechisch immer Deutsch nie

3.2 Welche Sprachen spricht das Kind mit **IHNEN**? (Bitte eine der Zahlen von 1 bis 5 umkreisen)

1	2	3	4	5
Griechisch nie Deutsch immer	Griechisch selten In der Regel Deutsch	Griechisch 50% Deutsch 50%	Griechisch normelerweise Deutsch selten	Griechisch immer Deutsch nie

3.3 Wie oft **lesen** Sie dem Kind vor? (Bitte eine der Zahlen von 1 bis 5 umkreisen)

1	2	3	4	5
Nie	Selten	Manchmal	Sehr oft	Jeden Tag

3.4 In welchen Sprachen **lesen** Sie dem Kind vor? ((Bitte eine der Zahlen von 1 bis 5 umkreisen)

1	2	3	4	5
Griechisch nie Deutsch immer	Griechisch selten In der Regel Deutsch	Griechisch 50% Deutsch 50%	Griechisch normelerweise Deutsch selten	Griechisch immer Deutsch nie

3.5 In welchen Sprachen **spricht** der andere Pfleger (falls vorhanden) mit dem Kind? (Bitte eine der Zahlen von 1 bis 5 umkreisen)

1	2	3	4	5
Griechisch nie Deutsch immer	Griechisch selten In der Regel Deutsch	Griechisch 50% Deutsch 50%	Griechisch normelerweise Deutsch selten	Griechisch immer Deutsch nie

3.6 In welchen Sprachen spricht das Kind **mit dem anderen Erziehungsberechtigten** (falls vorhanden)? (Bitte eine der Zahlen von 1 bis 5 umkreisen)

1	2	3	4	5
Griechisch nie Deutsch immer	Griechisch selten In der Regel Deutsch	Griechisch 50% Deutsch 50%	Griechisch normelerweise Deutsch selten	Griechisch immer Deutsch nie

3.7 Wie oft **liest** der andere Erziehungsberechtigte (falls vorhanden) dem Kind vor? (Bitte eine der Zahlen von 1 bis 5 umkreisen)

1	2	3	4	5
Nie	Selten	Manchmal	Sehr oft	Jeden Tag

3.8 In welchen Sprachen **liest** der andere Erziehungsberechtigte (falls vorhanden) dem Kind vor? (Bitte eine der Zahlen von 1 bis 5 umkreisen)

1	2	3	4	5
Griechisch nie Deutsch immer	Griechisch selten In der Regel Deutsch	Griechisch 50% Deutsch 50%	Griechisch normelerweise Deutsch selten	Griechisch immer Deutsch nie

- **Familieninformationen**

4.1 Allgemeine Informationen

Bitte kreisen Sie Ihre Antwort ein. (Hinweis: Die unten gestellte Fragen sind nur für die Bewertung der sozioökonomischen Situation**)**

Hat Ihre Familie ein Auto?	Nein	Ja, eins	Ja, mehr als eins	
Wie oft haben Sie in den letzten Jahren einen Familienausflug gemacht?	Keine	Eine	Zwei	Mehr als zwei
Wie viele Computer (oder Laptops) hat Ihre Familie?	Kein	Ein	Zwei	Mehr als zwei
Hat das Kind sein/ihr eigenes Zimmer?	Nein	Ja		

4.2 Informationen über SIE

4.2.1 Ausbildung: Bitte kreisen Sie die von Ihnen **absolvierte** Ausbildung ein.

Ihre Ausbildung	**Die Ausbildung des anderen Erziehungsberechtigten (falls vorhanden). Beziehung mit dem Kind angeben** _____
Grundschule	Grundschule
Realschule	Realschule
Gesamtschule	Gesamtschule
Gymnasium	Gymnasium
Universität - BA oder Diplom	Universität - BA oder Diplom
Universität - MA oder Magister	Universität - MA oder Magister
Universität - PhD oder Promotion	Universität - PhD oder Promotion
Andere (bitte angeben)	Andere (bitte angeben)

4.2.2 Welche Sprachen sprechen **SIE**? Setzen Sie ✓ in der entsprechenden Box.

	Ihre Sprachen	**Die Sprachen des anderen Erziehungsberechtigten**
Griechisch		
Deutsch		
Andere (bitte angeben)		

5

Fig. A.4 Questionnaire for Greek-German bilinguals in German used in Berlin, Germany This was given to the parents who consented to participate in the study

UNIVERSITY OF CAMBRIDGE
Faculty of Modern and Medieval Languages

Πληροφορίες για την μελέτη διγλωσσίας του Πανεπιστημίου Cambridge

Η κατάκτηση της φωνής από δίγλωσσα παιδιά: Μια συγκριτική μελέτη

Πριν αποφασίσετε να συμμετάσχετε σε αυτή τη μελέτη, είναι σημαντικό να καταλάβετε γιατί η έρευνα γίνεται και τι θα συνεπάγεται. Αφιερώστε λίγο χρόνο για να διαβάσετε προσεκτικά τις παρακάτω πληροφορίες και να τις συζητήσετε με άλλους, εάν το επιθυμείτε. Μπορείτε να έρθετε σε επαφή με τις ερευνήτριες εάν υπάρχει κάτι που δεν είναι σαφές ή εάν θέλετε περισσότερες πληροφορίες. Πάρτε χρόνο για να αποφασίσετε εάν επιθυμείτε ή όχι να συμμετάσχετε.

Σκοπός της έρευνας

Αυτή η μελέτη στοχεύει στη διερεύνηση του πώς τα δίγλωσσα παιδιά κατακτούν την γραμματική φωνή. Η μεσοπαθητική φωνή και διάθεση στα Ελληνικά συμπεριλαμβάνει ρήματα όπως πλένω/πλένομαι, χτενίζω/χτενίζομαι, αλλά επίσης και ρήματα όπως κοιμάμαι και χαίρομαι. Εμείς μελετάμε την γλώσσα των δίγλωσσων παιδιών για να δούμε σε ποια ηλικία αρχίζουν να χρησιμοποιούνται αυτά τα ρήματα και αν χρησιμοποιούνται το ίδιο και στην Αγγλική και στην Ελληνική γλώσσα. Αυτό θα το διερευνήσουμε χρησιμοποιώντας δύο "παιχνίδια" τα οποία θα γίνουν στην ελληνική γλώσσα και εξηγούνται παρακάτω. Οι γονείς/κηδεμόνες θα κληθούν επίσης να συμπληρώσουν ερωτηματολόγια ώστε να μας δώσουν κάποιες πληροφορίες για το γλωσσικό περιβάλλον των παιδιών.

Γιατί με επιλέξατε;

Πρόκειται για μια μελέτη σχετικά με την απόκτηση της ελληνικής γλώσσας και γι'αυτό οι συμμετέχοντες επιλέγονται με βάση το εάν πληρούν αυτό το κριτήριο. Πιο συγκεκριμένα, θέλουμε να διερευνήσουμε αυτό το φαινόμενο με δίγλωσσα παιδιά γεννημένα στην Αγγλία ηλικίας 4 έως 8 ετών.

Πρέπει να λάβω μέρος;

Η συμμετοχή στη μελέτη μας είναι εντελώς εθελοντική. Η άρνηση συμμετοχής ή η απόσυρση από τη μελέτη δεν συνεπάγεται ποινή ή απώλεια, τώρα ή στο μέλλον.

Τι θα συμβεί αν λάβω μέρος;

Η μελέτη θα πραγματοποιηθεί στο παιδικό σταθμό/δημοτικό σχολείο ή στο σπίτι του παιδιού. Θα υπάρξει μία συνεδρία περίπου 30 λεπτών. Οι γονείς/κηδεμόνες μπορούν να επιλέξουν πότε και πού θα διεξαχθεί η συνεδρία. Κατά τη διάρκεια της συνεδρίας το παιδί θα κάνει ένα τεστ λεξιλογίου έτσι ώστε οι ερευνήτριες να μπορούν να αξιολογήσουν τη γλωσσική του ικανότητα. Το παιδί θα παρακολουθήσει στη συνέχεια μερικά σύντομα βίντεο και θα πρέπει να απαντήσει σε μια ερώτηση σχετικά με καθένα από αυτά. Μετά απο αυτό θα κάνουμε ένα διάλειμμα. Στη συνέχεια, το παιδί θα ακούσει μια ιστορία και θα πρέπει να χρησιμοποιήσει κάποια παιχνίδια για να την αναπαραστήσει. Αυτό το κομμάτι της συνεδρίας θα μαγνητοσκοπηθεί έτσι ώστε οι ερευνήτριες να μπορούν να καταγράψουν τις απαντήσεις με ακρίβεια. Ο φακός της κάμερας θα επικεντρωθεί αποκλειστικά στα παιχνίδια και στην απίθανη περίπτωση που το παιδί βρεθεί σε οποιοδήποτε από τα βίντεο, αυτά θα διαγραφούν. Οι μαγνητοσκοπήσεις θα αναγνωρίζονται μόνο με έναν κωδικό και δεν θα χρησιμοποιηθούν ούτε θα διατεθούν για άλλους σκοπούς εκτός από το ερευνητικό έργο και θα καταστραφούν στο τέλος της μελέτης. Κανείς άλλος εκτός από τις ερευνήτριες δεν θα έχει πρόσβαση σε αυτά τα βίντεο. Όλα τα δεδομένα που συλλέγονται θα είναι ανώνυμα.

Υπάρχουν πιθανά μειονεκτήματα ή/και κίνδυνοι κατά τη συμμετοχή;

Δεν υπάρχουν προβλέψιμες δυσκολίες, μειονεκτήματα και κίνδυνοι.

Η συμμετοχή μου στη μελέτη θα είναι εμπιστευτική;

Όλα τα δεδομένα θα αναγνωρίζονται μόνο από έναν κωδικό, τα προσωπικά στοιχεία θα φυλάσσονται σε κλειδωμένο αρχείο ή ασφαλές υπολογιστή με πρόσβαση μόνο από την άμεση ερευνητική ομάδα.

Τι θα συμβεί στα αποτελέσματα της μελέτης;

Τα αποτελέσματα θα παρουσιαστούν σε συνέδρια και θα εκδοθούν σε περιοδικά. Τα αποτελέσματα παρουσιάζονται ανά ομάδες και όχι ατομικά. Εάν παρουσιαστούν μεμονωμένα δεδομένα, τα δεδομένα θα είναι εντελώς ανώνυμα, χωρίς να είναι δυνατός ο εντοπισμός των εμπλεκόμενων ατόμων.

Ηθική έγκριση της μελέτης

Η μελέτη έχει εγκριθεί από την Επιτροπή Ηθικής Έρευνας της Σχολής Σύγχρονων και Μεσαιωνικών Γλωσσών στο Πανεπιστήμιο του Cambridge.

Επικοινωνήστε με τις ερευνήτριες για περισσότερες πληροφορίες

Καθ. Ιάνθη Τσιμπλή - imt20@cam.ac.uk

Χριστίνα Γκρέυ - cg670@cam.ac.uk

Fig. A.5 Information sheet in Greek used in Cambridge and London, UK to recruit Greek-English bilinguals
This was given to the parents who consented to participate in the study

Συγκατάθεση των κηδεμόνων για συμμετοχή στη μελέτη

Τίτλος μελέτης: Η κατάκτηση της φωνής από δίγλωσσα παιδιά: Μια συγκριτική μελέτη

Ερευνητική ομάδα: Καθ. Ιάνθη Τσιμπλή, Χριστίνα Γκρέυ

Αν έχετε οποιεσδήποτε ερωτήσεις, επικοινωνήστε με την Χριστίνα Γκρέυ - cg670@cam.ac.uk ή την Καθ. Ιάνθη Τσιμπλή imt20@cam.ac.uk

☐ Επιβεβαιώνω ότι διάβασα και κατανόησα τις πληροφορίες για την μελέτη διγλωσσίας του Πανεπιστημίου Cambridge για την παραπάνω μελέτη και είχα την ευκαιρία να θέσω ερωτήσεις.

☐ Κατανοώ ότι η συμμετοχή μου είναι εθελοντική και ότι είμαι ελεύθερος/η να την αποσύρω ανά πάσα στιγμή, χωρίς να δώσω κανένα λόγο και χωρίς να επηρεαστούν τα δικαιώματά μου.

☐ Κατανοώ ότι τα δεδομένα που συλλέγονται θα χρησιμοποιηθούν και θα αποθηκευτούν ανώνυμα, σύμφωνα με τον Νόμο περί Προστασίας Δεδομένων. Τα αποτελέσματα παρουσιάζονται ανά ομάδες και όχι ατομικά. Αν παρουσιαστούν μεμονωμένα δεδομένα, τα δεδομένα θα είναι εντελώς ανώνυμα, χωρίς να είναι δυνατή η αναγνώριση των εμπλεκόμενων ατόμων.

☐ Κατανοώ ότι αυτά τα δεδομένα μπορούν να χρησιμοποιηθούν σε αναλύσεις, δημοσιεύσεις και παρουσιάσεις συνεδρίων από ερευνητές του Πανεπιστημίου του Cambridge και τους συνεργάτες τους σε άλλα ερευνητικά ιδρύματα. Δίνω άδεια σε αυτά τα άτομα να έχουν πρόσβαση σε αυτά τα δεδομένα.

☐ Μου δόθηκε αντίγραφο αυτής της φόρμας για τα προσωπικά μου αρχεία.

Εγώ ο/η _____ συμφωνώ να συμμετάσχω στην προαναφερθείσα μελέτη της Ιάνθης Τσιμπλή, καθηγήτρια στο Τμήμα MML του Πανεπιστημίου του Cambridge και της διδακτορικής φοιτήτριας Χριστίνα Γκρέυ.

_____ _____
Ημερομηνία Υπογραφή του/της συμμετέχοντος/χουσας

_____ _____ _____
Όνομα ερευνήτριας Ημερομηνία Υπογραφή της ερευνήτριας

Η μελέτη έχει εγκριθεί από την επιτροπή δεοντολογίας έρευνας της Σχολής
Εάν έχετε οποιεσδήποτε ερωτήσεις ή καταγγελίες σχετικά με τις δεοντολογικές πτυχές αυτής της μελέτης, επικοινωνήστε μαζί μας ethics@mml.cam.ac.uk

Fig. A.6 Consent form in Greek used in Cambridge and London, UK to recruit Greek-English bilinguals
This was given to the parents who consented to participate in the study

Participant Information Sheet

The acquisition of Voice alternations by bilingual children: A Comparative Study

Before you decide to take part in this study it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. The researchers can be contacted if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part.

Purpose of the study

This study aims at investigating how bilingual children, who are exposed to languages that have different ways of expressing voice alternations, acquire these voice systems. For example, when do children start to understand sentences such as "I am being chased" or "I am covering myself" in Greek? How does the simultaneous acquisition of English influence this acquisition path? I will investigate this using a truth-value judgement task and an act-out task both of which will be done in Greek and are explained below. Parents and caretakers will also be asked to fill out questionnaires informing me of the children's input and might also be asked to participate in the task itself as a control group.

Why have I been chosen?

This is a study on Greek-English bilingual language acquisition which is why the participants are selected based on whether they fit this criterion. More specifically, I want to investigate this phenomenon with bilingual English-Greek children who were born in the UK between the ages of 4 and 8.

Do I have to take part?

Taking part in our study is entirely voluntary. Refusal to participate or withdrawal from the study will involve no penalty or loss, now or in the future.

What will happen to me if I take part?

The study will take place at the child's nursery/primary school facility or at the child's home. The caretakers can choose when and where the study will take place. There will be one session approximately 30 minutes with a short break in-between. During the session the child will receive a vocabulary test so that the researchers can assess her/his linguistic competence. Firstly, the child will watch several short videos and will have to answer a question related to each one of them. After the break, the child will have to use toys to act out a sentence spoken by the investigator and this will be videotaped so that the researcher can then transcribe the child's answers. The camera lens will be focused on the toys and in the unlikely event of the child being in any of the videos, these will be accordingly blurred or deleted. Recordings will be identified only by a code, and will not be used or made available for any purposes other than the research project. These recordings will be destroyed at the end of the study. No one other than the investigators will have access to these videos. All of the data collected will be anonymous.

Are there possible disadvantages and/or risks in taking part?

There are no reasonably foreseeable discomforts, disadvantages and risks.

Will my taking part in this project be kept confidential?

All data will be identified only by a code, with personal details kept in a locked file or secure computer with access only by the immediate research team.

UNIVERSITY OF CAMBRIDGE
Faculty of Modern and Medieval Languages

What will happen to the results of the research project?

Results will be presented at conferences and written up in journals. Results are normally presented in terms of groups of individuals. If any individual data are presented, the data will be completely anonymous, without any means of identifying the individuals involved.

Ethical review of the study

The project has received ethical approval from the Research Ethics Committee of the Faculty of Modern and Medieval Languages at the University of Cambridge.

Contact for further information

Prof. Ianthi Tsimpli - imt20@cam.ac.uk

Christina Grey - cg670@cam.ac.uk

Fig. A.7 Information sheet in English used in Cambridge and London, UK to recruit Greek-English bilinguals
This was given to the parents who consented to participate in the study

CONSENT FORM

Project title: The acquisition of Voice alternations by bilingual children: A Comparative Study

Research team: Ianthi Tsimpli, Christina Grey

If you have any questions, please contact Christina Grey - cg670@cam.ac.uk or Prof. Ianthi Tsimpli imt20@cam.ac.uk

- ☐ I confirm that I have read and understand the participant information sheet for the above mentioned study and have had the opportunity to ask questions.
- ☐ I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, and without my rights being affected.
- ☐ I understand that any data that are collected will be used and stored anonymously, in accordance with the Data Protection Act. Results are normally presented in terms of groups of individuals. If any individual data were presented, the data would be completely anonymous, without any means of identifying the individuals involved.
- ☐ I understand that these data may be used in analyses, publications, and conference presentations by researchers at the University of Cambridge and their collaborators at other research institutions. I give permission for these individuals to have access to these data.
- ☐ I have been given a copy of this form to keep.

I _____ agree to participate in the above mentioned study run by Ianthi Tsimpli, a professor at the Faculty of MML at the University of Cambridge, and PhD student Christina Grey.

_____ _____
Date Signature of participant

_____ _____ _____
Name of researcher Date Signature of researcher

The project has received ethical approval from the Faculty's Research Ethics Committe
If you have any questions or complaints about the ethical aspects of this study, please contact ethics@mml.cam.ac.uk

Fig. A.8 Consent form in English used in Cambridge and London, UK to recruit Greek-English bilinguals
This was given to the parents who consented to participate in the study

UNIVERSITY OF CAMBRIDGE

Ερωτηματολόγιο για τη χρήση της γλώσσας

Να συμπληρωθεί από έναν από τους κηδεμόνες του παιδιού (π.χ. μητέρα, πατέρας, γιαγιά, παππούς κλπ.)

Η σχέση σας με το παιδί (π.χ. μητέρα, πατέρας, γιαγιά, παππούς κτλ.)	
Ονοματεπώνυμο:	
Ημερομηνία συμπλήρωσης:	

Σημείωση: Τα στοιχεία θα είναι ανώνυμα. Κανείς δεν θα έχει πρόσβαση στο όνομά σας ή στο όνομα του παιδιού σας, εκτός από τις ερευνήτριες (Καθ. Ιάνθη Τσιμπλή και Χριστίνα Γκρέυ). Δεν θα χρησιμοποιηθεί κανένα πραγματικό όνομα σε καμία αναφορά ή δημοσίευση.

ΣΑΣ ΕΥΧΑΡΙΣΤΟΥΜΕ ΠΟΛΥ ΠΟΥ ΑΦΙΕΡΩΣΑΤΕ ΤΟ ΧΡΟΝΟ ΓΙΑ ΝΑ ΣΥΜΠΛΗΡΩΣΕΤΕ ΑΥΤΟ ΤΟ ΕΡΩΤΗΜΑΤΟΛΟΓΙΟ. ΠΑΡΑΚΑΛΟΥΜΕ ΝΑ ΤΟ ΕΠΙΣΤΡΕΨΕΤΕ ΣΤΟ ΣΤΑΘΜΟ/ΣΧΟΛΕΙΟ Ή ΣΤΙΣ ΕΡΕΥΝΗΤΡΙΕΣ

Εάν έχετε οποιεσδήποτε ερωτήσεις, μη διστάσετε να έρθετε σε επαφή με τις ερευνήτριες: Καθ. Ιάνθη Τσιμπλή - imt20@cam.ac.uk, Χριστίνα Γκρέυ - cg670@cam.ac.uk.

- **Γενικές πληροφορίες σχετικά με το παιδί:**

1.1 Ονοματεπώνυμο παιδιού:	
1.2 Ημερομηνία γέννησης παιδιού:	
1.3 Ηλικία παιδιού:	
1.4 Φύλο παιδιού:	
1.5 Τόπος γέννησης παιδιού (πόλη και χώρα):	
1.6 Αν ο τόπος γέννησης του παιδιού δεν αντιστοιχεί στη σημερινή χώρα κατοικίας, γράψτε την ημερομηνία άφιξης στη σημερινή χώρα κατοικίας:	

1.7 Ποιες γλώσσες μιλάει και/ή καταλαβαίνει το παιδί σας; Βάλτε ✓ στα Ελληνικά και στα Αγγλικά και σημειώστε κάθε επιπλέον γλώσσα στο αντίστοιχο κουτάκι του πίνακα. Παρακαλώ γράψτε κάθε γλώσσα που μιλάει/καταλαβαίνει το παιδί, ακόμη κι αν έχει περιορισμένη ικανότητα σε αυτήν.

Ελληνικά	
Αγγλικά	
Άλλη γλώσσα Α:	
Άλλη γλώσσα Β:	

- **Πληροφορίες σχετικά με τις γλωσσικές ικανότητες του παιδιού και την έκθεσή του στη γλώσσα**

2.1 Σε ποια ηλικία ξεκίνησε το παιδί σας να εκτίθεται συστηματικά σε κάθε μία από τις γλώσσες του/της;

Γλώσσα	**Ηλικία (σε χρόνια και μήνες)**
Ελληνικά	
Αγγλικά	
Άλλη γλώσσα Α	
Άλλη γλώσσα Β	

Τι εννοούμε με το "συστηματικά": το παιδί ξεκίνησε να πηγαίνει σε σχολείο (π.χ. νηπιαγωγείο /δημοτικό /ολοήμερο) όπου δίνονται οδηγίες σε αυτήν τη γλώσσα ή κάποιος από τους κηδεμόνες (π.χ. γονείς, νταντά, κτλ.) του παιδιού ξεκίνησε να χρησιμοποιεί συστηματικά αυτή τη γλώσσα με το παιδί.

2.2 Πόσο καλά πιστεύετε ότι το παιδί σας **μιλάει** την κάθε γλώσσα; Σημειώστε ✓ στο κατάλληλο κουτάκι.

	Έλλειψη ευχέρειας λόγου	**Περιορισμένη ευχέρεια λόγου**	**Σχετική ευχέρεια λόγου**	**Αρκετή ευχέρεια λόγου**	**Μεγάλη ευχέρεια λόγου**
	Μικρή ικανότητα στην προφορική έκφραση	Μερική ικανότητα. Μπορεί να παράγει μικρές, απλές προτάσεις π.χ. να απαντήσει στο τηλέφωνο ή να χαιρετήσει έναν γείτονα	Καλή προφορική έκφραση, μπορεί να μιλήσει για διάφορα θέματα π.χ. να εξηγήσει τι θέλει, να δώσει πληροφορίες	Μπορεί να χρησιμοποιήσει τη γλώσσα επαρκώς στις περισσότερες περιστάσεις	Μπορεί να εκφράζεται με άνεση στη γλώσσα σε κάθε περίσταση
ΕΛΛ					
ΑΓΓΛ					
Α					
Β					

2.3 Πόσο καλά πιστεύετε ότι είναι το παιδί σας **καταλαβαίνει** κάθε γλώσσα; Σημειώστε ✓ στο κατάλληλο κουτάκι.

	Όχι επαρκής κατανόηση	**Περιορισμένη κατανόηση**	**Σχετική κατανόηση**	**Αρκετή κατανόηση**	**Μεγάλη κατανόηση**
	Χαμηλή ικανότητα κατανόησης	Μερική κατανόηση π.χ. μπορεί να καταλάβει απλούς διαλόγους	Καλή κατανόηση του 45% έως 55% της επικοινωνίας	Μπορεί να κατανοήσει τη γλώσσα επαρκώς στις περισσότερες περιστάσεις, π.χ. να παρακολουθήσει ταινίες ή εκπομπές	Καταλαβαίνει σχεδόν τα πάντα
ΕΛΛ					
ΑΓΓΛ					
Α					
Β					

- **Πληροφορίες σχετικά με τη χρήση της γλώσσας μεταξύ των κηδεμόνων και του παιδιού**

3.1 Τι γλώσσα/-ες μιλάτε **ΕΣΕΙΣ** με το παιδί σας; **(**Παρακαλώ κυκλώστε έναν από τους αριθμούς από το 1 έως το 5)

1	2	3	4	5
Ελληνικά ποτέ Αγγλικά πάντα	Ελληνικά σπάνια Αγγλικά συνήθως	Ελληνικά 50% Αγγλικά 50%	Ελληνικά συνήθως Αγγλικά σπάνια	Ελληνικά πάντα Αγγλικά ποτέ

3.2 Ποιες γλώσσες μιλάει το παιδί μαζί **ΣΑΣ**; **(**Παρακαλώ κυκλώστε έναν από τους αριθμούς από το 1 έως το 5)

1	2	3	4	5
Ελληνικά ποτέ Αγγλικά πάντα	Ελληνικά σπάνια Αγγλικά συνήθως	Ελληνικά 50% Αγγλικά 50%	Ελληνικά συνήθως Αγγλικά σπάνια	Ελληνικά πάντα Αγγλικά ποτέ

3.3 Πόσο συχνά διαβάζετε **ΕΣΕΙΣ** στο παιδί σας; **(**Παρακαλώ κυκλώστε έναν από τους αριθμούς από το 1 έως το 5)

1	2	3	4	5
Ποτέ	Σπάνια	Μερικές φορές	Πολύ συχνά	Κάθε μέρα

3.4 Σε ποιες γλώσσες **διαβάζετε** στο παιδί σας; **(**Παρακαλώ κυκλώστε έναν από τους αριθμούς από το 1 έως το 5)

1	2	3	4	5
Ελληνικά ποτέ Αγγλικά πάντα	Ελληνικά σπάνια Αγγλικά συνήθως	Ελληνικά 50% Αγγλικά 50%	Ελληνικά συνήθως Αγγλικά σπάνια	Ελληνικά πάντα Αγγλικά ποτέ

3.5 Ποιες γλώσσες **μιλάει** ο άλλος κηδεμόνας (αν υπάρχει) με το παιδί; **(**Παρακαλώ κυκλώστε έναν από τους αριθμούς από το 1 έως το 5)

1	2	3	4	5
Ελληνικά ποτέ Αγγλικά πάντα	Ελληνικά σπάνια Αγγλικά συνήθως	Ελληνικά 50% Αγγλικά 50%	Ελληνικά συνήθως Αγγλικά σπάνια	Ελληνικά πάντα Αγγλικά ποτέ

3.6 Ποιες γλώσσες μιλάει το παιδί **με τον άλλο κηδεμόνα** (αν υπάρχει); **(**Παρακαλώ κυκλώστε έναν από τους αριθμούς από το 1 έως το 5)

1	2	3	4	5
Ελληνικά ποτέ Αγγλικά πάντα	Ελληνικά σπάνια Αγγλικά συνήθως	Ελληνικά 50% Αγγλικά 50%	Ελληνικά συνήθως Αγγλικά σπάνια	Ελληνικά πάντα Αγγλικά ποτέ

3.7 Πόσο συχνά διαβάζει **ο άλλος κηδεμόνας** (αν υπάρχει) στο παιδί; **(**Παρακαλώ κυκλώστε έναν από τους αριθμούς από το 1 έως το 5)

1	2	3	4	5
Ποτέ	Σπάνια	Μερικές φορές	Πολύ συχνά	Κάθε μέρα

3.8 Σε ποιες γλώσσες διαβάζει **ο άλλος κηδεμόνας** (αν υπάρχει) στο παιδί; **(**Παρακαλώ κυκλώστε έναν από τους αριθμούς από το 1 έως το 5)

1	2	3	4	5
Ελληνικά ποτέ Αγγλικά πάντα	Ελληνικά σπάνια Αγγλικά συνήθως	Ελληνικά 50% Αγγλικά 50%	Ελληνικά συνήθως Αγγλικά σπάνια	Ελληνικά πάντα Αγγλικά ποτέ

- **Πληροφορίες σχετικά με την οικογένεια**

4.1 Γενικές πληροφορίες

Παρακαλώ κυκλώστε την απάντησή σας. (Σημείωση: Οι παρακάτω ερωτήσεις είναι μόνο για δημογραφικούς λόγους**)**

Η οικογένειά σας έχει αυτοκίνητο;	Όχι	Ναι, μόνο ένα	Ναι, πάνω από ένα	
Τα τελευταία χρόνια, πόσες φορές κάνατε κάποιο ταξίδι σαν οικογένεια;	Καμία	Μία	Δύο	Περισσότερες από δύο
Πόσους υπολογιστές (φορητούς ή σταθερούς) έχει η οικογένειά σας;	Κανέναν	Έναν	Δύο	Περισσότερους από δύο
Το παιδί έχει δικό του δωμάτιο;	Όχι	Ναι		

4.2 Πληροφορίες σχετικά με ΕΣΑΣ

4.2.1 Εκπαίδευση: Παρακαλώ κυκλώστε το επίπεδο εκπαίδευσης που **έχετε ολοκληρώσει.**

Η εκπαίδευσή σας	**Η εκπαίδευση του άλλου κηδεμόνα (αν υπάρχει). Παρακαλώ αναφέρετε τη σχέση με το παιδί _____**
Δημοτικό Σχολείο	Δημοτικό Σχολείο
Γυμνάσιο	Γυμνάσιο
Λύκειο	Λύκειο
Πανεπιστήμιο - Πτυχίο (ή ΤΕΙ)	Πανεπιστήμιο - Πτυχίο (ή ΤΕΙ)
Πανεπιστήμιο - Μεταπτυχιακό	Πανεπιστήμιο - Μεταπτυχιακό
Πανεπιστήμιο - Διδακτορικό	Πανεπιστήμιο - Διδακτορικό
Άλλο (διευκρινίστε)	Άλλο (διευκρινίστε)

4.2.2 Ποιες γλώσσες μιλάτε **ΕΣΕΙΣ**; (Παρακαλώ σημειώστε ✓ στο κατάλληλο κουτάκι.)

	Οι γλώσσες σας	**Οι γλώσσες του άλλου κηδεμόνα**
Ελληνικά		
Αγγλικά		

Fig. A.9 Questionnaire for Greek-English bilinguals in Greek used in Cambridge and London, UK
This was given to the parents who consented to participate in the study

UNIVERSITY OF CAMBRIDGE

Language Use Questionnaire

To be filled in by one of the child's main caregivers (e.g. mother, father, grandparent, foster carer).

Your relationship to the child (e.g. mother, father, grandmother, foster carer, etc.):

Your full name:

Today's date:

Note: The data will be anonymised. No one apart from the two researchers (Prof. Ianthi Tsimpli and Christina Grey) will have access to your or your child's name. No real names will be used in any report or publication.

THANK YOU FOR TAKING THE TIME TO FILL OUT THIS QUESTIONNAIRE. PLEASE COMPLETE IT & RETURN IT TO YOUR CHILD'S SCHOOL OR TO THE RESEARCHER

If you have any questions, please do not hesitate to contact the researchers: Christina Grey - cg670@cam.ac.uk, Prof. Ianthi Tsimpli - imt20@cam.ac.uk

- **1. General Information about the Child:**

1.1 Child's full name:

1.2 Child's date of birth:

1.3 Child's age:

1.4 Child's sex:

1.5 Child's place of birth (city/ town and country):

1.6 If the child's place of birth is not the current country of residence, write the date of arrival in the current country of residence:

1.7 What language(s) can your child speak and/or understand? Tick for English and Greek and write any additional language(s) in the appropriate cell of the table. Please write every language the child can speak/understand even if she/he has little ability in it.

English	
Greek	
Other language A:	
Other language B:	

2. Information about the Child's Language Abilities and Exposure

2.1 At what age did your child start receiving consistent and significant exposure to each of his/her languages?

Language	Age in years and months
Greek	
English	
Other language A	
Other language B	

What we mean by consistent and significant: the child started attending a school (e.g., primary school / kindergarten / daycare) where instruction was held in that language, or one of the main caregivers (e.g., babysitter, caregivers) of the child started to consistently use that language with the child.

2.2 How fluent would you say your child is in **speaking** his/her languages? Please tick the appropriate box.

	Not fluent	Limited fluency	Somewhat fluent	Quite fluent	Very fluent
	Little speaking ability	Some ability; can say short, simple sentences, e.g. answer the phone, or greet a neighbour	Good speaking skills; can express him/herself on many topics, e.g. explain what he/she wants; give instructions	Can use the language adequately in most situations	Very comfortable expressing him/herself in the language in all situations
GR					
EN					
A					
B					

2.3 How competent would you say your child is in **understanding** his/her languages? Please tick the appropriate box.

	Not Competent	**Limited Competence**	**Somewhat Competent**	**Quite Competent**	**Very Competent**
	Little understanding ability	Some understanding, e.g. can understand simple conversations	Good understanding of 45% to 55% of communication	Can understand the language adequately for most situations, e.g. follow films or TV shows	Understands almost everything
GR					
EN					
A					
B					

3. Information about the Caregivers' Use of Language(s) with the Child

3.1 What language(s) do **YOU** speak with your child? (Please circle one of the numbers from 1 to 5)

1	2	3	4	5
English never Language(s) A and/or B always	English seldom Language(s) A and/or B usually	English 50% Language(s) A and/or B 50%	English usually Language(s) A and/or B seldom	English always Language(s) A and/or B never

3.2 What languages does the child speak with **YOU**? (Please circle one of the numbers from 1 to 5)

1	2	3	4	5
English never Language(s) A and/or B always	English seldom Language(s) A and/or B usually	English 50% Language(s) A and/or B 50%	English usually Language(s) A and/or B seldom	English always Language(s) A and/or B never

3.3 How often do **YOU** read to your child? (Please circle one of the numbers from 1 to 5)

1	2	3	4	5
Never	Seldom	Sometimes	Very often	Every day

3.4 In what languages do **YOU** read to your child? (Please circle one of the numbers from 1 to 5)

1	2	3	4	5
English never Language(s) A and/or B always	English seldom Language(s) A and/or B usually	English 50% Language(s) A and/or B 50%	English usually Language(s) A and/or B seldom	English always Language(s) A and/or B never

3.5 What language(s) does **THE OTHER MAIN CAREGIVER** (if any) speak with the child? (Please circle one of the numbers from 1 to 5)

1	2	3	4	5
English never Language(s) A and/or B always	English seldom Language(s) A and/or B usually	English 50% Language(s) A and/or B 50%	English usually Language(s) A and/or B seldom	English always Language(s) A and/or B never

3.6 What languages does the child speak with **THE OTHER MAIN CAREGIVER** (if any)? (Please circle one of the numbers from 1 to 5)

1	2	3	4	5
English never Language(s) A and/or B always	English seldom Language(s) A and/or B usually	English 50% Language(s) A and/or B 50%	English usually Language(s) A and/or B seldom	English always Language(s) A and/or B never

3.7 How often does **THE OTHER MAIN CAREGIVER** (if any) read to the child? (Please circle one of the numbers from 1 to 5)

1	2	3	4	5
Never	Seldom	Sometimes	Very often	Every day

3.8 In what languages does **THE OTHER MAIN CAREGIVER** (if any) read to the child? (Please circle one of the numbers from 1 to 5)

1	2	3	4	5
English never Language(s) A and/or B always	English seldom Language(s) A and/or B usually	English 50% Language(s) A and/or B 50%	English usually Language(s) A and/or B seldom	English always Language(s) A and/or B never

4. Information about the Family

4.1 General information.

Please circle your answer. NB.(questions are only for SES assessment)

a. Does your family have a car?	No	Yes, just one	Yes, more than one	
b. During the past year, how many times did you travel away on holiday as a family?	None	One	Two	More than two
c. How many computers (laptops or desktop) does your family own?	None	One	Two	More than two
d. Does the child have his/her own bedroom?	Yes	No		

4.2 Information about YOU

4.2.1 Education: Please circle the level of education **YOU** have completed

What is your highest level of education? Please circle your answer.

YOUR EDUCATION	**ANY OTHER PARENT OR GUARDIAN'S EDUCATION (if applicable) Please state relation to child _____**
Primary School	Primary School
Secondary School	Secondary School
College	College
University – degree	University – degree
University – masters	University – masters
University – PhD	University – PhD

4.2.2 What language(s) do **YOU** speak? (Please tick the appropriate box)

	Your languages	**Other caretaker's languages**
Greek		
German		
Other (please specify)		

Thank you very much for completing this questionnaire!

5

Fig. A.10 Questionnaire for Greek-English bilinguals in English used in Cambridge and London, UK
This was given to the parents who consented to participate in the study

Appendix B

Test items and other materials

Table B.1 TVJT items in order of appearance

Item no	Puppet sentence	True or false	Target production	Subject animacy	Target Voice	Condition
1	O Dimitrakis kimithike = Dimitrakis slept	True	NA	animate	Active	Trial
2	I Mama eklise to psigio = Mum closed the fridge	False	anikse = opened	animate	Active	Trial
3	O Mpampas ekapse to vivlio = Dad burnt the book	True	NA	animate	Active	Trial
4	O Dimitrakis gargalise to arkoudaki = Dimitrakis tickled the teddy bear	False	agaliase = hugged	animate	Active	Trial
5	O Dimitrakis plithike = Dimitrakis washed himself	True	NA	animate	Non-active	IR
6	I kuries agaliastikan = The ladies hugged each other	True	NA	animate	Non-active	F
7	O Dimitrakis plithike = Dimitrakis washed himself	False	ksistike = scratched	animate	Non-active	R
8	O antras ke i gineka pantreftikan = The man and the woman got married	True	NA	animate	Non-active	F
9	To arkudaki skupistike = The teddy bear was wiped	True	NA	inanimate	Non-active	P
10	To lagudaki katharise to parathiro = The bunny cleaned the window	False	espase = broke	animate	Active	F
11	O Dimitrakis htenistike = Dimitrakis combed himself	True	NA	animate	Non-active	IR
12	To paputsi ksekolise = The shoe (sole) came off	True	NA	animate	Active	F

Item no	Puppet sentence	True or false	Target production	Subject animacy	Target Voice	Condition
13	To arkudaki plithike = The teddy bear was washed	False	ntithike = was dressed	inanimate	Non-active	P
14	I baniera gemise = The bathtub was filled up	True	NA	inanimate	Active	F
15	O papus kratithike apo tin skepi = Grandpa held himself from the roof	True	NA	animate	Non-active	R
16	I porta eklise = The door closed	False	anikse = opened	inanimate	Active	F
17	O Dimitrakis skepastike = Dimitrakis covered himself	False	ntithike = got dressed	animate	Non-active	IR
18	I baniera adiase = The bathtub was emptied	False	gemise = was filled up	inanimate	Active	F
19	To arkudaki taistike = The teddy bear was fed	False	plithike = was washed	inanimate	Non-active	P
20	O Dimitrakis eskase tin roda = Dimitrakis 'popped' the tyre	False	girise = spinned	animate	Active	F
21	O Dimitrakis vgike apo to spiti = Dimitrakis went out of the house	False	kriftike = hid	animate	Non-active	R
22	To lagudaki lerothike apo tin laspi = The bunny was stained by the mud	True	NA	animate	Non-active	F
23	To arkudaki htenistike = The teddy bear was combed	True	NA	animate	Non-active	P
24	I mama tripithike apo tin velona = Mum pricked herself with the needle	True	NA	animate	Non-active	F
25	O Dimitrakis epline ta dontia tu = Dimitrakis brushed his teeth	False	skupistike = wiped himself	animate	Non-active	IR
26	To pithikaki htipise to lagudaki = The monkey hit the bunny	False	htipithike = was hit	animate	Active	F
27	To skilaki gliftike = The puppy licked itself	True	NA	animate	Non-active	R
28	Ta pedia agaliastikan = The kids hugged each other	False	gargalithikan = tickled each other	animate	Non-active	F

IR = inherently reflexive items, R = reflexive items, P = passive items, F = filler items.

Target production applies only for the false statements.

Target Voice is determined by the target production verb otherwise by the sentences uttered by the puppet.

Table B.2 AOT items in order of appearance

Item no	Test items	Subject animacy	Condition
1	I Ana ke i mama agaliastikan = Anna and mum hugged each other	animate	Trial
2	I Ana gemise to kuti = Anna filled the box	animate	Trial
3	I mama klotsise to kuti = Mum kicked the box	animate	Trial
4	O Giorgakis sikothike apo to krevati = Giorgakis got up from bed	animate	F
5	O Giorgakis plithike sto niptira = Giorgakis washed himself in the sink	animate	IR
6	O Giorgakis forese tis padofles tu = Giorgakis put on his slippers	animate	F
7	O niptiras skupistike apo ton Giorgaki = The sink was wiped by Giorgakis	inanimate	P
8	Emfanistike enas drakos = A dragon appeared	animate	F
9	O Giorgakis kriftike piso apo tin dulapa = Giorgakis hid behind the wardrobe	animate	R
10	I Ana ksistike me tin vurtsa = Anna scratched herself with the brush	animate	R
11	I Ana forese tin fusta tis = Anna put on her skirt	animate	F
12	I Ana htenistike brosta sto kathrefti = Anna combed in front of the mirror	animate	IR

Item no	Test items	Subject animacy	Condition
13	I Ana erikse to aroma tis pano sto hali = Anna dropped the perfume on the carpet	animate	F
14	To hali plithike apo tin Ana = The carpet was washed by Anna	inanimate	P
15	I Ana katharise ton kathrefti	animate	F
16	I mama ntithike = Mum got dressed	animate	IR
17	I mama piastike apo tin karekla = Mum 'leaned' on the chair	animate	R
18	To skilaki anevike stin karekla = The dog climbed on the chair	animate	F
19	To skilaki htenistike apo tin mama = The dog was combed	animate	P
20	I mama filise to skilaki = Mum kissed the dog	animate	F

IR = inherently reflexive items, R = less frequent reflexive items, P = passive items, F = filler items.

Condition here refers to the target re-enactment.

Fig. B.1 "Elenitsa," the frog puppet used for TVJT

Table B.3 Greek AOT stories in order of appearance with their English translations
Experimental items in bold

	AOT stories
Story 1	
Greek original	O Giorgakis **sikothike** apo to krevati.
	Meta o Giorgakis **plithike** sto niptira.
	Otan teliose, o Giorgakis forese tis pantofles tu.
	O niptiras **skupistike**.
	Ksafnika emfanistike enas drakos ke o Giorgakis **kriftike** piso apo tin ntulapa.
English translation	Giorgakis **got up** from bed.
	Then Giorgakis **washed himself** at the sink.
	When he finished, Giorgakis put on his slippers.
	The sink **was dried**.
	Suddenly a dragon appeared and Giorgakis **hid** behind the warbrobe.

Story 2	
Greek original	I Ana **ksistike** me tin vurtsa.
	Meta I Ana forese tin fusta tis.
	Epita I Ana **htenistike** brosta sto kathrefti.
	Kata lathos i Ana erikse to aroma tis pano sto hali.
	To hali **plithike** me sapuni.
	Sto telos i Ana katharise ton kathrefti me ena pani.
English translation	Anna **scratched herself** with a brush.
	Then Anna put on her skirt.
	Afterwards Anna **combed** in front of the mirror.
	Accidentally Anna spilled her perfume on the carpet.
	The carpet **was washed** with soap.
	Finally Anna cleaned the mirror with a rug.

Story 3	
Greek original	I mama anikse tin dulapa.
	I mama **ntithike**.
	Meta I mama p**iastike** apo tin karekla.
	To skilaki anevike stin karekla kai meta to skilaki **htenistike** me tin htena.
	I mama filise to skilaki.
English translation	Mum opened the wardrobe.
	Mum **got dressed**.
	Then mum **"leaned"** on the chair.
	The dog climbed on the chair and then the dog **was combed** with the brush.
	Mum kissed the dog.

Fig. B.2 The toys that were given to the participants for each story